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PRINCIPAL CONTENTS

	Page
Features	
Leader: Price Policy	665
Luncheon	672
Correspondence	683 and 692
Forthcoming Events (Advert. section)	33
Technical	
Welding of Malleable Castings, by T. J. Palmer	667
External Dust Control for a Pedestal Grinder, by W. H. White and W. B. Lawrie	673
News	
Ironfoundry Working Conditions	666
A.B.B.F. London-area Meeting	672
Personal, and Obituary	686
Parliamentary	687
Scots Firm's Stand against Union	687
News in Brief	690
Raw Material Markets	692
Statistics	
Foreign and U.K. Iron and Steel Prices	682
Imports and Exports of Iron and Steel in October	688
Current Prices of Iron, Steel and Non-ferrous Metals (Advert. section)	32

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Price Policy

The foundry industry, following an increased wages award together with enhanced prices for certain raw materials and a proposed higher scale of charges for freightage, has had a particularly unwelcome Christmas present. Where rigid costing shows the impossibility of absorbing these increased costs, then obviously they must be passed on. Before this is done, however, it would be as well to emulate the action taken by a number of foundry owners in letters to their suppliers. We quote an example sent out by a large foundry concern:—"We hope that you have decided, like so many others, to resist the temptation of revising your selling prices. . . . We shall therefore appreciate an early indication from you that, in fact, you will be absorbing this increase and you may rest assured that gestures of this nature will stimulate further business to be placed with you in due course." A second foundry, after stating the intention of the firm is to stabilize prices at the present level, have asked their customers "to assist us by continuing to place and, if possible, increase their business with us."

Price stability is bound up with higher productivity and to attain this the goodwill of the workmen must be gained. The possibilities of this were emphasized in a brilliant after-dinner speech by Mr. Lion-Cachet, the newly-elected president of the South African engineering employers' association. He is reported to have said:—

"In some large establishments overseas very interesting experiments have been made by putting a number of workers in a room by themselves and changing the temperatures and taking readings of their output. It was found that the output went up. Even when the temperature was lowered the output still went up. Then the humidity was changed and the output kept on improving. Eventually, in desperation, the room's condition was brought back to the original, and the output went up again. It was then discovered that the reason for the increased output had nothing to do with the physical conditions, but was due to the fact that notice was taken of these people; they felt themselves important and worked harder to try to please."

Our advice to all founders who are trying to absorb the new charges, is (1) to take the staff fully into their confidence and try to gain their co-operation by explaining that wages do not come out of the managing director's trousers' pocket, but from the customers, (2) tell the customers of the action being taken and ask for increased business, and (3) write to their suppliers and seek their collaboration. If the several thousands of foundries would do this, their action would tend to stabilize market prices and at the same time give no excuse to the price-cutters who, the minute the buyers' market is well established, rear their ugly heads. On the other hand, if increases are deemed to be essential, let there be no general percentage, as, despite elementary arithmetic, these do not always work out quite as expected.

Ironfoundry Working Conditions

Private Member's Bill before Parliament this Week

Provision for the better protection of the health and safety of workers in ironfoundries is proposed in the Foundry Workers (Health and Safety) Bill, a private member's Bill presented by Miss Herbison, Labour member for North Lanark, with the support of Labour and some Conservative members. The Bill is second on the list of private members' Bills to be considered on second reading in the House of Commons to-morrow.

It is apparent that the measure seeks to provide legal enforcement in iron foundries for many of the provisions of the "Garrett Report." Implementation of the recommendations of this Report has been widely practised already on a voluntary basis throughout the foundry industry, not only in ironfoundries. To this end there is a permanent joint advisory committee in being, and all the organizations within the industry have contributed. The text of the main clauses of the Bill are substantially as follow:—

For the purposes of promoting cleanliness, tidiness and safety in connection with work in ironfoundries the following requirements shall be observed:—(*a*) Moulding boxes, loam plates, ladles and other heavy articles kept inside a foundry shall, if not in constant use, be stacked in a safe and orderly manner in a space separate from the working area; (*b*) patterns, pattern-plates, moulding boxes, frames, boards, box weights, loam plates and other heavy articles in constant use shall be arranged in a safe and orderly manner; (*c*) convenient racks, bins and other receptacles shall be provided and used for the storage of miscellaneous gear and tools; (*d*) bins, bunkers or other suitable receptacles shall be provided for the storage of sand, fuel, metal scrap or other bulk materials and residue; and (*e*) no person shall carry out any work within a distance from a cupola or furnace of 12 ft. or three times the diameter of any ladle (some exceptions are cited).

Gangways, Dust and Fumes

(1) In every new iron foundry after the coming into operation of this Act—(*a*) gangways and pouring aisles shall be kept free from obstructions, and shall be constructed in such a manner as to provide an even surface of concrete, brick or other similar hard material, but not of sand, except where by virtue of the nature of the work involved the use of sand is unavoidable; (*b*) gangways, if not used for carrying molten metal, shall be at least 3 ft. in width; (*c*) gangways, used for carrying molten metal, shall be fashioned in size according to the normal ladle traffic (details of which are stipulated), and (*d*) pouring aisles shall be not less than 18 in. wide, sufficient not to imperil the safety of persons carrying or pouring molten metal. (2) In every iron foundry in existence at the coming into operation of this Act clearly defined gangways of suitable width shall be provided, properly maintained and kept free from obstructions to conform in effect with the provisions of the foregoing sub-section.

As from the appointed day, the following provisions shall apply in relation to all iron foundries:—(*a*) open coal, coke or wood fires of a portable nature shall not be used for the purpose of heating workrooms; (*b*) open coal, coke or wood fires shall not be used for heating or drying ladles inside a workroom, unless adequate measures are taken to prevent fumes or other impurities from entering into the atmosphere of the workroom; (*c*) no coal, coke or wood fires shall be used for drying moulds except in circumstances in which the use of such fires is unavoidable; (*d*) mould and core stoves shall be so designed, constructed, maintained and worked as to prevent, so far as practicable, offensive or injurious fumes from entering into any workroom during any period when a person is employed therein. Clauses (*e*) to (*f*) in this section and their sub-clauses all designate that knock-out and fettling or dressing operations shall be segregated from the rest of the operations and suitable local exhaust or general ventilation shall be arranged.

Protective Clothing and Amenities

The occupier of every ironfoundry shall provide suitable protective equipment of the type and for the processes hereinafter specified for the protection of employees engaged in any such process, that is to say—(*a*) safety boots and adequate leg protectors for any employee engaged in carrying or pouring metal; (*b*) non-inflammable overalls for any employee engaged in carrying or pouring metal or attending at the cast; (*c*) adequate gloves or hand-leathers for any employee engaged in handling hot metal, hot plates, moulding boxes, cores, pig-iron or other material likely to cause damage to his hand by burn or sear; (*d*) facial respirators for any employee engaged on cleaning or easing castings, or on knock-out operations or on carrying out operations inside a cupola or furnace, or on any operations creating a heavy dust concentration which cannot be dispelled quickly and effectively by the process of ventilation in use; and (*e*) suitable goggles, hygienically maintained to protect the eyes of any employee engaged in handling molten metal or in any other process liable to cause risk of injury to the eyes.

In every ironfoundry there shall be provided as from the appointed day—(*a*) sufficient and suitable baths situated in individual cubicles for the use of persons engaged in the workrooms to which this Act applies; (*b*) a suitable changing room adjoining each room in which such baths are situated; and (*c*) an adequate number of lockers or other suitable arrangements in or adjacent to such changing rooms for the accommodation of clothing belonging to persons using the baths.

Application

The power of the Minister to make regulations or orders under this Act shall be exercisable by statutory instrument, and any such instrument shall be subject to annulment in pursuance of a resolution of either House of Parliament. Certain of the clauses may be amended, modified or extended by regulations made by the Minister of Labour and National Service.

Then follow in the Bill a number of definitions, for instance, "iron foundry" includes a factory or that department of a factory in which iron castings are produced by casting in moulds made of sand, loam, moulding composition or other mixtures of materials, and includes workrooms in which the following processes are carried on as incidental or supplemental processes in connection with such production, namely, the preparation of moulds, the preparation and mixing of materials used in the foundry process, core-making, or the heat-treatment, welding or cleaning of castings; while "knock-out operations" includes all methods of removing castings from dry-sand or loam moulds.

If the Bill is made law, there is a final paragraph which reads: "This Act may be cited as the Factory (Foundry Workers) (Health and Safety) Act, 1952, and shall be construed as one with the Factories Acts, 1937 and 1948, and this Act and those Acts may be cited together as the Factories Acts, 1937 to 1952. Sections one, two and four of this Act shall not come into force until January, 1954.

Welding of Malleable Castings

By T. J. Palmer, A.M.I.W.

Considering its general usefulness and the diversity of its applications to-day, malleable cast iron receives much less attention than is merited, and collected information on the welding of it seems both scarce and widely dispersed. This is unfortunate, because the cloak of ignorance which surrounded this material before the advent of metallurgical science persists in certain sections of using industries. There are few practical signs of malleable iron castings being replaced by other materials and, although it has been suggested upon more than one occasion that nodular-graphite cast iron will ultimately offer a better and cheaper product, malleable cast goods continue to be made and used in ever-increasing quantities both here and abroad. Joining of these castings has always been something of a problem, and the Author endeavours in this article to present critically a number of aspects and to offer means of solving the difficulty.

As the term implies, malleable cast irons differ from the ordinary grey variety in that they are to some extent ductile and shock-resisting. Such castings are produced as a result of annealing low-silicon cast irons having a fully white structure, as shown in Fig. 1. Reaumur (1722) is credited with discovering that white cast iron could be softened and made ductile by heating continuously in contact with an oxidizing medium such as Fe_2O_3 and castings so treated were termed "whiteheart" because of their coarse, steel-like fracture. Subsequently, Seth Boyden (1826) working in America softened such iron by packing in a non-reactive material and, in contradistinction, castings so annealed were termed "blackheart" by reason of their silky black fracture. Both types of malleable iron casting have been widely used.

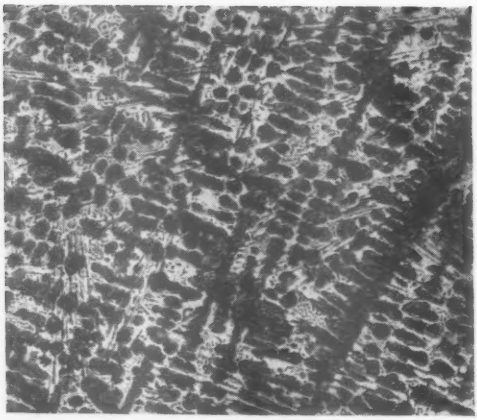
Process Differences

The basic feature of Reaumur's process is one of packing the castings in crushed hematite ore followed by heating very slowly to approximately 950 deg. C. and holding at that temperature for anything from 20 to 100 hr. according to section size and other factors. Progressive decarburization occurs in consequence, as the oxygen in the ore reacts with the carbon in the castings and the process thereafter becomes continuous as the carbon in the interior diffuses to the surface. With very thin sections, the result is naturally one of almost complete decarburization producing an all-ferritic structure, but with thicker sections there is a certain amount of graphitization and a specimen will then show an outer band of decarburized iron followed by a wider zone of ferrite and pearlite with some small temper-carbon particles, and this in turn merges into a "core" of coarse pearlite and larger temper-carbon nodules. It is evident that whiteheart castings may show considerable structural variation from exterior to interior in specimens of differing thicknesses, and this is in fact the case, although the matter has been to some extent adjusted by closer control of the oxidizing reaction. Even so, whiteheart malleable iron castings tend to be much less uniform structurally than blackheart types.

The method of making "blackheart" malleable iron differs principally because the packing medium used is inactive. Sand, crushed slag, or dead annealing ore are frequently used and the castings are heated very slowly to about 900 deg. C. Softening occurs in two distinct stages in the blackheart method. When held at the temperature mentioned for about 50 hr., the whole of the cementite is dissolved, whereupon the malleablizing process commences by the formation of graphite nuclei. Development and growth of these "temper-carbon" particles follows as a matter of course. There still remains a certain amount of carbon in solution however, and after cooling fairly slowly to 760 deg. C., the speed is delayed still further by taking about 3 to 4 degrees per hour down to 680 deg. C., during which period the remaining carbon in solution is precipitated as temper carbon. The structure at this final stage consists of ferrite and graphite as shown in Fig. 2, and since little or no decarburization reaction has proceeded at the surface, the structure will be uniform across the entire section of the casting. In terms of the original product, both blackheart and whiteheart varieties of malleable iron are most usefully ductile with the latter rather tougher and stronger, but somewhat less soft and ductile. Uniformity is more or less assured with the blackheart process regardless of section size (within certain limits), but this is difficult to achieve with whiteheart material, excepting with very thin metal. It has been necessary to emphasize this distinction between the two types of malleable cast iron before passing on to a technical study of its weldability.

Prior Considerations

In spite of certain fundamental differences between whiteheart and blackheart types there is an important similarity from the welding aspect, namely that except with thin sections of whiteheart iron there is invariably a certain amount of graphite or free carbon present and this feature alone causes micro-structural instability above 750 deg. C. Jointing processes operating below this restricted temperature are unfortunately confined to soft-soldering and silver-brazing, where applications are limited to capillary-type joints in tubes and corresponding fittings of the sleeve type. The bulk



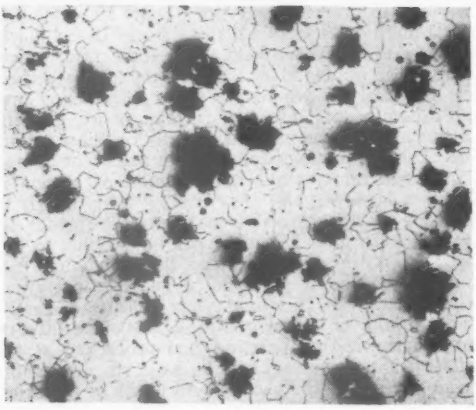


FIG. 1 (TOP).—*White Cast Iron before being subjected to the Malleablizing Process, etched,* × 100 *mags.*

FIG. 2 (BELOW).—*Same Iron as in Fig.* 1 *after being Fully Annealed* (*Blackheart Process*), *etched,* × 100 *mags.*

of goods requiring attention, however, fall within the wider field of industrial castings used by the automobile, mining, railway, agricultural, and electrical trades.

Because of the presence of free carbon in all malleable castings of sizeable section whether whiteheart or blackheart, the changes which occur upon heating to high temperatures apply to both, but since blackheart is the most uniform material of the two, this study of weldability is confined largely to specimens of this type. It can be stated quite definitely however, that structural modifications of a closely related type must also occur with the whiteheart variety. It is merely a matter of degree, the one exception being thin-walled metal, which for all practical purposes is carbon-free. Undoubtedly, the problem of the fusion welding of whiteheart malleable material would be greatly simplified were it not for the unavoidable metallurgical discrepancy between thin and thick sections; as it is, one must re-emphasize at this juncture that the presence of any proportion of temper-carbon particles in the iron has a most profound bearing upon its weldability.

As far as welding is concerned, malleable cast iron is in a class apart and presents a special problem due to the inevitable hardening which heating and cooling introduces. Similar conditions exist with some of the air-hardening steels, but if these are preheated and slowly cooled, the effect may often be counteracted, upon which a fusion-welded joint will be soft and machinable. Malleable cast iron responds in no such obliging manner, however, and reactions which occur at fusion welding heat are of an altogether more stable nature than with the steels.

If a piece of blackheart malleable cast iron is melted locally with the oxy-acetylene flame, there is a characteristic " drawing-away " as the melting point is approached and, when cold, the iron is found to be both intensely hard and porous. The addition of iron or steel filler rod results in sparking and other reactions in the weld zone, and a spongy, useless sort of joint is produced. Conditions for arc welding are very little different fundamentally and the " fusion " welding of malleable cast iron is, in fact, quite impractical for reasons which will be shown.

Metallurgical Considerations

The difficulties may be analysed and the effects explained if the iron shown in Fig. 2 is subjected to treatment at different temperatures ranging from 750 to 1,300 deg. C., and specimens so treated are illustrated in Figs. 3 to 8, inclusive. In Fig. 3, where the specimen was heated to 775 deg. C., the matrix is no longer ferritic, but shows some pearlite and, as a result, there is a slight increase in hardness and a corresponding fall in ductility. In Fig. 4 (850 deg. C.) the process of decomposition has advanced to the stage where the matrix is basically pearlitic with a " peppering " of ferrite running through it, and in Fig. 5 (900 deg. C.) it is wholly pearlitic. In Fig. 6 (1,000 deg. C.) there are visible signs of some carbide threads and the effect of this upon physical properties should be obvious. The structure in Fig. 7 (1,100 deg. C.) shows a thickening of the carbide network and some " splines " within the grains, leaving no element of doubt concerning what is taking place; namely, that the original annealing cycle is being reversed, but in a fraction of the time it took to complete. In Fig. 8 (1,275 deg. C.) the change is all but complete and the resultant structure not unlike that of Fig. 1. The complete cycles may be represented by the reversible reaction:—

$$\underset{\text{(white cast iron)}}{\text{Iron Carbide + Pearlite}} \xrightarrow{\text{annealing}} \underset{\text{(malleable iron)}}{\text{Graphite + Ferrite}}$$

$$\xleftarrow{\text{re-heating}}$$

The specimens referred to were exposed in a furnace to the temperatures indicated for about 15 min., sufficient to permit proper diffusion of absorbed carbon throughout the mass, so that the changes illus-

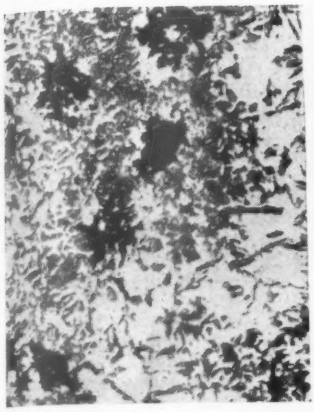


FIG. 3.—775 *deg. C.*

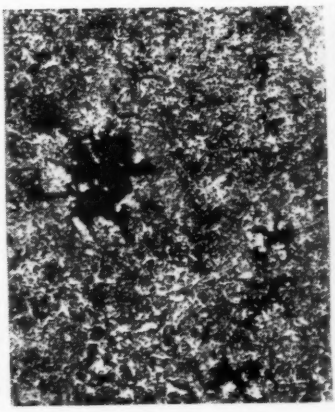


FIG. 4.—850 *deg. C.*

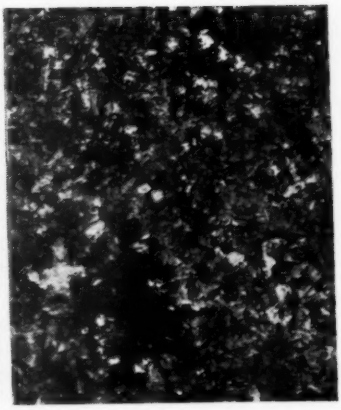


FIG. 5.—900 *deg. C.*

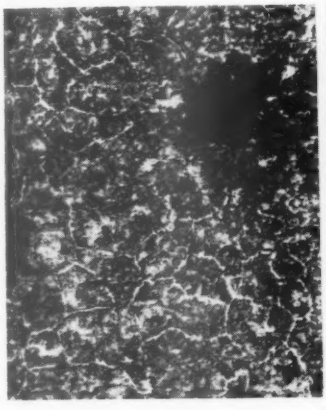


FIG. 6.—1,000 *deg. C.*

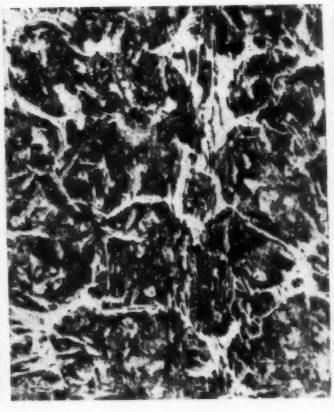


FIG. 7.—1,100 *deg. C.*

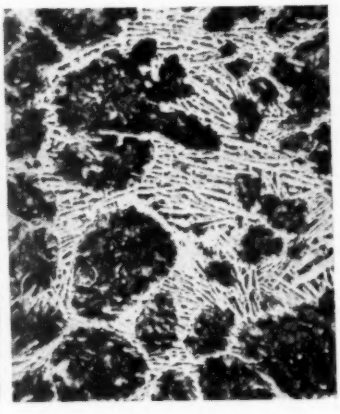


FIG. 8.—1,275 *deg. C.*

FIGS. 3 TO 8 INCLUSIVE.—*Blackheart Malleable-iron Specimens re-heated to Various Temperatures ranging from 775 to 1,275 deg. C. for 15 min. in a Gas-fired Furnace (all etched).*

trated were substantially complete. In welding such material, the effects would be somewhat similar for the same temperatures, but much less general, the tendency being for changes in structure to be localized to areas around the temper-carbon nodules; this is clearly shown in Fig. 13, which is referred to later. Figs. 3 to 8 are useful, however, as they depict what can, and does, happen to malleable cast iron when heated above 750 deg. C. Since all commercially-useful jointing processes operate at temperatures in excess of this, they also act as a rough guide to the balance of structural constituents likely to be present when using any one welding process. Thus, all changes shown will be present in fusion-welded joints, regardless of the process employed. Moreover, the time factor has only a minor influence, *i.e.*, the process of reversal from graphite to carbide takes place completely in both gas and arc welds, whether preheating is resorted to or not. In sections of joints made by fusion welding, the structures indicated are present panoramically and show more-or-less progressive hardening right up to the weld interface, and may thus present all stages in hardness from 120 to 500 or 600 Brinell, corresponding roughly to the hardness of malleable iron and white cast iron respectively. It is obvious that the phenomenon can in no way be affected or controlled by the type of filler metal used—disregarding normal diffusion effects, which are secondary in this instance; the mere fact that the malleable iron has been raised to melting point is enough.

Welders of experience hardly need reminding of the practical difficulties to be encountered when fusion welding malleable cast iron, and it is hoped that sufficient information has been given to those (and there are many) who still believe that satisfactory fusion welds in malleable-iron castings are possible and that it is really just a question of finding

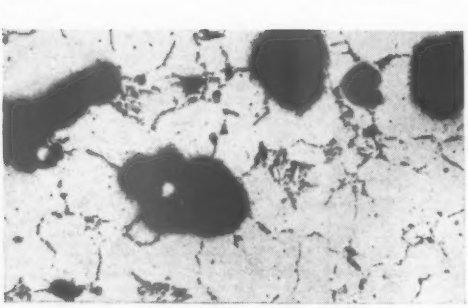


FIG. 9 (TOP).—*Porosity in Malleable Cast Iron after heating to approximately 1,150 deg. C., unetched,* × 200.

FIG. 10 (BELOW).—*Specimen heated to approximately 1,150 deg. C., showing absence of Free Carbon. (Unetched.) The General Specimen showed Mass Porosity as illustrated in Fig. 9.*

the correct filler metal. Once again, excluding very thin sections of whiteheart iron, a prohibitive degree of hardening accompanies any fusion welding process—arc or gas—whether the job is preheated or not, the former showing a close band of high hardness and the latter one which, though very much wider, is little less hard.

Porosity

As regards porosity, this also is out of the hands of the practical welder, however good he may be. Porosity will, and must, occur to some extent whenever malleable cast iron is heated to close on its melting point. It may also occur in the weld deposit, more especially when steel filler rods are used, although there is no connection between the two types. In the deposit, porosity is caused by reactions with any oxide or slag present, whereas in the parent metal it is due to a form of shrinkage brought about from the structural adjustment. It takes place automatically if the iron be heated to 1,150 deg. C. or thereabouts (Fig. 9) and, although some free carbon still remains undissolved at this temperature, solution thereafter is extremely rapid, no graphite remaining undissolved at 1,250 deg. C (Fig. 10). Porosity begins at a definite temperature and the condition at 1,150 deg. C. is illustrated at magnifications of 200 and 600, respectively, in Figs. 11 and 12, where the mechanism for promoting shrinkage cavitation would appear to be in motion. It is probable, therefore, that porosity found in re-heated malleable iron and also that observed in welds occurs during the graphite/carbide change and is directly associated with shrinkage, which is considerable around 1,150 to 1,200 deg. C. Thus, fusion welds made with any of the usual commercial processes show degrees of porosity near the weld interface corresponding to heating within the temperature range mentioned.

It is interesting to note that porosity occurs when welding both types of malleable and more particularly with whiteheart, perhaps, in spite of its lower free carbon content. The effect, however, is probably due to reaction from surface slag formed during annealing. Most whiteheart irons do in fact show characteristic gassing and swelling during welding, whereas blackheart shows a peculiar "drawing-away" as mentioned previously. These two different practical effects can be linked up logically with the technical aspects already discussed.

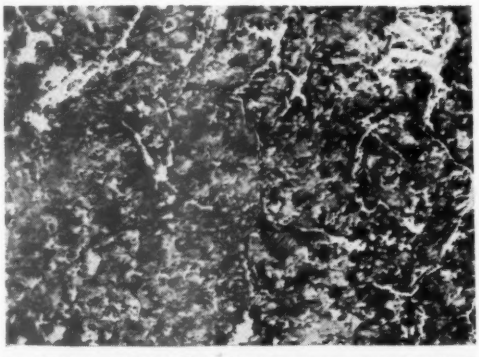
Practical methods of Jointing

A certain amount of repair work has been carried out on malleable iron castings using the electric-arc process with nickel-alloy electrodes, and many jobs have stood up quite well, while others have failed because of insufficient joint ductility. There is no doubt that a repair of this sort is a great improvement on full-fusion welding and the lower temperatures employed are noticeably reflected in the microstructure obtained in the weld. Porosity in the parent metal is avoided in practice, although unfortunately the deposit itself is inclined to micro-porosity. Welds of this type show a large decrease in the amount of massive carbide present, which occurs in this case as a narrow lattice in the section, practically on the line of the weld, followed by the usual threads of carbide immediately beyond. The dual effect of a lower operating temperature and the presence of the nickel is undoubtedly useful and, though joints so made are not "malleable" in the original sense, they seem tolerably satisfactory in practice. Small electrodes and low operating currents are naturally required. The fact that heating to 820 deg. C. for 15 to 20 min. breaks down almost all the free carbide formed in welds of this type is a feature which can possibly be attributed to the presence of nickel which may diffuse and render the carbide particles unstable.

Bronze Welding

Better results are obtained with bronze welding, where temperatures much in excess of 900 deg. C. need never be reached and this is in fact the "recognized" process for welding malleable iron castings. The photomicrograph in Fig. 13 shows a typical weld from which it is evident that considerable quantities of ferrite are retained right up to the joint edge. The general effect is one of partial absorption of carbon at the welding temperature and this is subsequently thrown out of solution as pearlite

surrounding the graphite nodules. At higher magnification, Fig. 14, this is shown up more clearly together with detail of the peculiar make-up of a joint of this type. Either the general-purpose alloy filler rod or one containing a nickel addition may be used for the bronze welding of malleable cast iron and there is ample strength in each case. Parts are prepared in the normal way, as for ordinary cast iron, that is to say, the faces should be clean and a suitable "V" or "U" groove prepared. It is unnecessary to sear the joint faces or otherwise attempt to oxidize away the graphite particles, as the welding of malleable iron is not accompanied by the sluggishness so characteristic of grey irons. The art of good bronze welding is to work at a minimum temperature and it is only necessary to heat the joint locally to a dull red before welding commences. Standard oxy-acetylene welding equipment is used; a blowpipe tip slightly smaller than for fusion welding is recommended, with a slightly oxidizing adjustment. Flux can be applied either as powder, or paste. Operational technique consists of adding to the heated surface a small quantity of filler rod, which spreads out and "tins" the parent iron—the process thereafter becoming one of building-up with the tinning action always just ahead of metal deposition. Protracted cooling is not required with bronze-welded joints in malleable cast iron, and the cracking risk is practically non-existent.



FIGS. 11 (TOP) AND 12.—*Malleable Iron heated to 1,150 deg. C., showing the Mechanism of Shrinkage Cavitation (etched Fig. 11 × 200 and Fig. 12 at × 600 mags).*

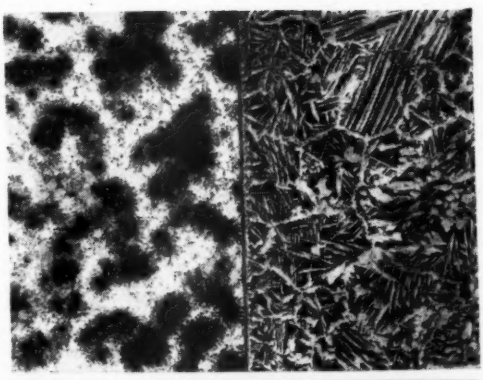


FIG. 13 (TOP).—*Photomicrograph of a Bronze Weld in Malleable-iron Casting illustrating how little the Parent-metal Structure (left) has changed as a result of using this Low-temperature Jointing Process.*

FIG. 14.—*Same Joint as in Fig. 13 at higher magnification, showing (left) a Temper-carbon Nodule surrounded by Medium Pearlite, together with appreciable Ferrite.*

Applications

Innumerable examples exist where bronze welding has proved very satisfactory indeed and the joint possesses a good measure of ductility with satisfactory tensile strength. Filler metals "*a*," "*c*," and "*d*" to B.S. 1724:1951 (bronze-welding by gas) are all suitable for malleable iron. With worn parts such as shackles, links, thrust pads, etc., the 9 per cent. nickel-bronze alloy is especially useful and confers a tough wear-resisting deposit which will in many cases outlive the mating part. Further examples of the use of this alloy is for bearing housings and axle ends where "spinning" of ball or roller race cages has worn away the iron; the increased resistance to pounding provided by

Welding of Malleable Castings

nickel-bronze is especially useful here. Should colour match be important, a nickel-bronze alloy containing 14 per cent. nickel is available and this gives excellent colour match with the parent iron. For the majority of breaks and fractures on the other hand, the general-purpose bronze-welding rod (alloy "*a*") is very satisfactory, and is cheaper. The jointing of malleable cast iron to other metals is readily accomplished by the same process.

Malleable iron castings can be "brazed," but a minimum of heat input should be used and the lowest-melting-point brazing metal selected. If silver-bearing alloys to B.S. 1845, type (3), be used, the parent casting will not be affected, and will be only slightly modified by the employment of type (4). Structural effects brought about in brazing, however, are general and not localized as in bronze welding and will approximate fairly closely to those shown in Figs. 3 to 5, according to the type of brazing metal employed. Thus, if B.S. 1845, types (8) and (9) fillers be employed, the malleable-iron structure will approach that shown in Figs. 4 and 5, when the general ductility of the casting will be adversely affected. Good temperature control is necessary for best results in brazing and temperature values should not exceed the melting point of the brazing alloy by more than about 50 deg. C. Arc welding of malleable with bronze electrodes is carried out to some extent, but upon a much smaller scale than by using oxy-acetylene methods. In arc welding, the well-known 60/40 copper/zinc silicon-bearing alloys are unsuitable and the use of tin-, or aluminium-bronzes is more general.

Conclusions

It is important to remember that malleable cast iron is very sensitive to temperature changes above 750 deg. C. and the lowest heat input possible should be used for whatever process of welding be employed. Machining difficulties will be encountered with welds made at temperatures above 950 deg. C., more particularly with low-heat-input welding processes and such joints may crack and fail in service due to insufficient ductility and a lowered resistance to impact. On the other hand, the condition may be modified somewhat by the time factor. For instance, an arc weld made with nickel-alloy electrodes may be reasonably satisfactory in service, but a gas weld made with the same type of filler-rod would turn out objectionably hard due to the extended welding time, which provides a wider heat-affected zone. For this same reason pre-heating of malleable castings before welding, is to be strongly discouraged. It is as well to bear in mind that, once massive carbides have formed in the parent metal as a result of heating or welding, there is small hope of breaking them down and regaining ductility by normal post-welding treatment; that is, the effect is permanent for all practical purposes.

With malleable cast iron, the welder is dealing with a very unstable product. In the annealed state it will show a hardness in the region of 115 Brinell with some 15 to 20 per cent. elongation, but as to how much change these test values will undergo after welding must depend entirely upon the sensible approach to the subject. With bronze welding, satisfactory joints are obtained with a minimum heat input and this process is recommended for repairing or assembling such castings.

A.B.B.F. London-area Meeting

Following luncheon at the Clarendon Hotel, Hammersmith, last Thursday, the London-area members of the Association of Bronze and Brass Founders heard a most instructive talk on "Recent Developments in Feeding Techniques," by Mr. A. R. French, of J. Stone & Company. First, the Author listed the advantages accruing from the use of exothermic feeding compound for aluminium-bronze and high-tensile brass castings. He preferred, he said, to use ready-made riser sleeves of the material and gave comparative cost data. Next, he dealt with porous plaster sleeves in like manner, telling of his firm's experiences to date with this material *vis-a-vis* the exothermic variety. Finally, by way of a digression, he exhibited sections of "castings" in coloured stearine waxes, where change of colour of the medium was used experimentally to simulate and trace feeder metal which was added at a late stage.

Other items on the agenda included a review by Mr. L. H. Tarring of the metal-market position; a brief bibliography of information on the shell-moulding process by Mr. A. R. Parkes; a note on desirable statistics to be furnished, and a report on the recent European Productivity Symposium, this latter being introduced by Mr. W. R. Marsland, president of the Association. Under the "technical" heading were discussed such matters as a code of inspection procedure, the B.S. 1400 schedule of alloys and the British Non-Ferrous Metals Research Association's current programme. Before closing the meeting, an invitation was extended to members to bring along guests to these functions, as a means ultimately of widening the representation of the A.B.B.F. in the copper-base founding industry.

Luncheon

MR. BARRINGTON HOOPER

At the Constitutional Club, London, last Thursday Mr. Barrington Hooper gave a luncheon party to present the original portraits by Mr. Marc Stone to those personalities who have been featured in *Motor Industry* and the FOUNDRY TRADE JOURNAL. The guests present were: Mr. H. C. Wilson Bennetts; Mr. W. R. Black; Mr. John V. Collins; Mr. R. Gresham Cooke; Dr. C. J. Dadswell; Colonel K. C. Johnson-Davies; Mr. D. L. Fairley; Mr. V. C. Faulkner; Mr. C. H. Fisher; Mr. F. Barrington Hooper; Mr. Ian MacKnight; Mr. C. Muirhead; Mr. James Shaw, and Mr. Henry Spurrier.

Rosenhain Medal.—It was announced last Thursday that the Council of the Institute of Metals has decided to make the award of the Rosenhain Medal this year to Dr. C. E. Ransley, M.Sc., for his work on gas and metal reactions.

External Dust Control for a Pedestal Grinder*

Part I by W. H. White, F.R.S.A.
Part II by W. B. Lawrie, M.Sc., F.R.M.S., A.I.M.

(*Continued from page* 645)

PART II—DUST OBSERVATIONS AND DETERMINATIONS

The method of dust observation and photography described in a previous Paper[1] has been used to assist in the development of the new extraction device, careful visual observations having been made throughout the work whilst certain salient features have been photographed. In addition to the spot-lights described in the earlier Paper, a film projector was also used as a source of illumination. This film projector was fitted with a 500-w. lamp and a normal optical system. Working in complete darkness, with the projector forming the only source of illumination, it was found that small air currents could be seen quite clearly in the narrow beam provided by the instrument. These air currents were seen most easily when looking up into the incident beam, towards its source in such a fashion that the line of sight made an angle of 5 to 10 deg. with the line of the incident beam. It was also possible to observe major air streams which were much wider than the incident beam, but in this case the air stream had to be scanned by continuously moving the light source, and it was more convenient to use the larger spot-lights for these main air streams. On the other hand, the narrow light beam of the projector revealed small air movements which were obscured by the glare of the larger lamps. It proved possible to photograph dust illuminated by the projector, but the main photography was done by means of the illumination system previously described, and the dust photographs included in this Paper are all untouched prints taken from the cinematograph film negative.

The stand grinder, on which the work was done, had been mounted against a wall, and in close proximity to the filter unit, so that it was impossible to place either the camera or the lamps behind the machine. This increased the difficulties of cinematography because the machine itself could not be used to shade the camera from the direct glare of the illuminating system. As a result the photographs had to be taken from the front or side of the machine and, in general, the camera and lamps were placed in one of the positions shown in Figs. 5, 6 and 7.

Dust Collector

The pedestal grinder was fitted with a conventional local exhaust-ventilation system. The fan was placed between the grinder and the dust collector, so that the latter was under pressure and the extracted air passed from the wheel hood, through the fan and then into the dust collector. In order to avoid the recirculation of filtered air, the dust collector was vented to the open air. The main object of the work was to observe the aerodynamics of the local exhaust-ventilation systems which were applied to the wheel, and for this reason it was decided to commence by exploring any existing dust streams which might be present in the atmosphere, and which might be originating from other sources. In consequence the first observations were made on the dust collector.

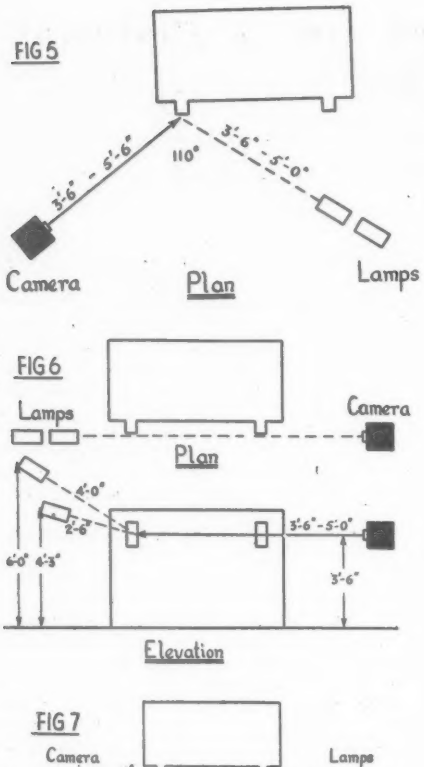
A black cloth was placed on the floor to minimize the glare of the lamp, and the camera was mounted above the dust collector, and directed towards the floor on the side of the collector adjacent to the grinding wheel. A constant and fairly heavy stream of dust was seen to be leaking from the dust collector at an appreciable velocity and moving across the front of the grinding wheel. The intensity of this dust cloud varied with the amount of dust being generated by the grinding action, but the cloud was present throughout the experimental work and invariably moved in the same direction. In general, the illuminating system was adjusted to render this cloud invisible so that the streams from the machine could be photographed, but, even so, when grinding material which produced heavy dust clouds, the leakage from the dust collector built up to such an extent that this extraneous cloud was sufficient to mask completely the primary stream from the wheel itself. Fig. 8 is a photograph of the side of the collector adjacent to the stand grinder and shows this effect. It might be noted in passing that two other sides of the dust collector showed a similar leakage of dust, and that it was impossible to observe or photograph the fourth side, as this was too near the wall of the room. Many efforts were made to stop this dust leakage during the course of the work, but they all proved unsuccessful.

The design and construction of dust-collecting and filtering units forms no part of the subject of this Paper, but it is impossible to leave this matter without commenting that the containers should at least be dust-tight, and that this point is of considerable importance if the fan is so placed within the system that the container is under positive pressure.

Stand Grinder

The experimental work was done on a double-headed machine fitted with 14-in. by 2½-in. wheels which ran at peripheral speeds of 5,000 ft. per min.

* Paper read before the London branch of the Institute of British Foundrymen, Mr. D. Graham Bisset presiding. Mr. White is attached to the British Cast Iron Research Association, and Mr. Lawrie to H.M. Inspectorate of Factories (Engineering and Chemical Branch).



FIGS. 5, 6, AND 7.—*Alternative Arrangements of Camera and Lamps for Recording the Dust Clouds.*

As the previously published work had dealt with high-speed wheels, it was decided to examine this slower wheel with a view to elucidating the aerodynamic effects produced. It was immediately evident that the slower wheel was producing a similar fan effect to that obtained from the high-speed wheels and previously described.[1] Dust which originated from the point of contact of the casting and the wheel was carried round the wheel periphery and delivered from the space between the top of the wheel and the guard (see Fig. 9). This dust stream, which will be referred to as the primary stream,

FIG. 8.—*Dust Leakage from Dust Collector (viewed from above looking towards the Floor).*

flowed down the face of the wheel and was deflected by the work or the rest. At the point of contact with the work, two secondary dust streams separated from the primary stream, one coming from each side. These two streams flowed along the work, or the rest, in opposite directions along a line parallel to the wheel face (see Fig. 10). The primary stream, turning through 90 deg., flowed along the top of the work until it met some obstruction. If this obstruction was caused by the body of the operator, the dusty air stream turned upwards, through 90 deg., as indicated in Fig. 9. If, however, it met other obstructions such as the operator's hands, or projections on the work being ground, erratic air streams and vortices were set up, although finally a large secondary stream still flowed up the operator's chest.

The projector was used as a light source to make preliminary observations at the point of origin of the dust. It was apparent that the fine dust was following the wheel round, but it was also obvious that heavier dust would leave the wheel soon after it had been generated at the point of contact between the wheel and the casting being ground. Any efficient dust control system would have to deal with this heavier dust, and so it was decided to make certain rough observations of dust movement near to the work rest. Many erratic dust streams were observed, but it was perfectly clear that the size and shape of the work, and the position of the operator's hands, had a considerable effect on the distribution and velocity of the smaller air currents and vortices occurring in the vicinity of the rest. For instance, in certain cases, the dust stream could be brought either over or under the operator's hand, by a simple movement of his wrist.

One or two particular effects are worthy of note. A long casting, held at the end remote from the wheel produced the most nearly streamlined effect, although turbulence was at once introduced if the casting was held in the middle with the operator's thumb forming an obstruction to the air stream. Grinding the lower edge of a square casting resulted in turbulence in the primary air stream, although

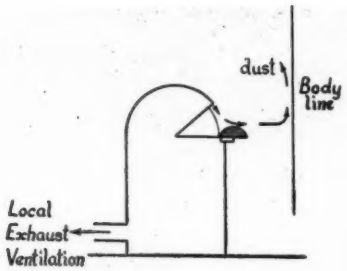


FIG. 9.—*Photograph and Diagrammatic Representation of a Primary Dust-stream from a Grinder (Conventional Local Exhaust Ventilation System fitted and operating).*

if the top edge of a square casting was applied to the wheel, a somewhat different effect was observed, as shown in Fig. 11. From the point of generation, the heavier dust was thrown forward and downwards from the rest, whilst the lighter dust followed the wheel round to form the primary stream, in which some turbulence developed.

The observations corroborated the distribution of air currents detected with the Velometer and recorded in Fig. 1, and when all the evidence was considered together, it was decided that the four dust streams indicated in Fig. 12 would have to be collected if the exhaust system was to control the dust.

External Hood

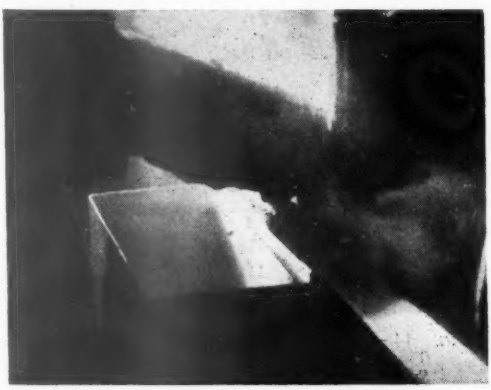
When the external cardboard hood had been fitted to the machine, a further series of observations were made. The object of this hood was to examine the possibility of collecting the primary and secondary dust streams set up by the rotation of the wheel itself, and no attempt was made at this stage to deal with the heavier dust projected from the work rest. The wheel was first photographed with the hood fitted and the extraction system inoperative. This was done to obtain a visual comparison with conditions when the extraction system was operating. Fig. 13 shows these conditions, and it is noticeable that some dust is coming from below the operator's hand.

The conventional extraction unit fitted to the wheel was then started and further photographs were taken. Fig. 14 indicates the result obtained, and it will be seen that the ordinary extraction system is inducing sufficient draught in the hopper below the wheel to control the dust which previously issued from below the hand of the operator. This only occurred in certain circumstances, but it was apparent that this particular dust stream could be controlled.

Further photographs were taken when both the normal extraction fan and the vacuum cleaner pipe were working. It was seen from Fig. 15 that the main air currents in the space between the operator's face and the top of the wheel were quite definitely influenced by the vacuum cleaner exhausting through the cardboard hood. The unit was a very crude piece of equipment, and could not be expected to show any marked efficiency. It served, however, to indicate the possibilities of the proposed method, and on the basis of photographs such as Fig. 15 it was decided to design and construct a prototype.

External Extraction System

The new external extraction system was observed and photographed when the machine was being used



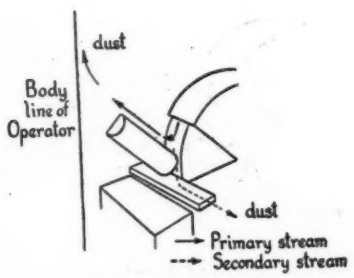


FIG. 10.—*Photograph and Diagram of a Secondary Dust-stream flowing along the Work Rest. (Ventilating system not working).*

FIG. 11—*Secondary Dust-stream projected from the Work Rest. (Conventional Local Exhaust System fitted and operating).*

to grind material which was chosen to produce particularly heavy dust clouds. This was done so that the behaviour of the system could be observed when it was being offered dust clouds far in excess of any that would normally appear. Even in these conditions of extreme overloading the system appeared to be well able to control the dust clouds, and only on two occasions during a long series of tests were the high velocity air curtains penetrated by the dust streams. On both these occasions a good deal of the escaping dust was brought back into the system after the very heavy cloud had momentarily broken through the controlling air curtains.

The system was fitted both with long extraction-arms and with nozzles over the top of the wheel, and in consequence both methods of applying the air curtain were tested separately. The nozzles appeared to be as efficient as the long arms although it has not yet been possible to perform reliable differential tests to determine the relative efficiency of the two methods. It was of interest to notice that the nozzles appeared to be more efficient than the long arms in cases where a long

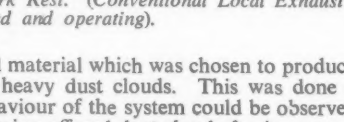


FIG. 12.—*Dust-streams requiring Collection if the Extraction System is to be Efficient.*

FIG. 13.—*Cardboard External Hood in Use (No Exhaust Ventilation).*

casting was being ground at an acute angle to the work rest.

Before observing the systems with the fans operating, photographs were taken when grinding rusty sand-cast pig-iron without local exhaust ventilation. Fig. 16 is one of these photographs and will serve as a basis of comparison for subsequent photographs taken with the exhaust system working.

Dust Control with Long Arms

The system was first used with exhaust applied to the hopper only in order to determine the effect on the work rest. In these circumstances the dust from the primary stream was, of course, not controlled, but it was found that the hopper exhaust served the purpose for which it had been installed and controlled the secondary dust streams which were projected from the work rest. The effects observed can be seen in the film, and Figs. 18 and 19 show the dust movements around the work rest.

The system was also observed without the hopper

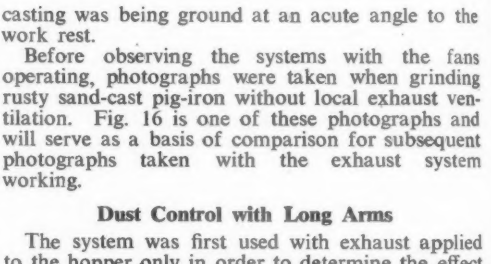


FIG. 14.—*Cardboard External Hood in Use (Conventional Local Exhaust Ventilation System operating).*

exhaust, when the long extraction arms and the vertical ducts were working. In these conditions the primary dust stream was collected by the exhaust system, although the absence of the hopper exhaust allowed the secondary streams from the rest to escape and rise towards the operator. Some of this escaping dust was exhausted by the long arms after it had risen above them, and these conditions are recorded in the film.

Finally, the machine was observed with both fans working. It will be seen from Fig. 17 that the dust occasionally penetrated the air-curtain when a long casting was ground at an acute angle. In this particular case the nozzles appeared to be somewhat superior, as they took the dust cloud quite readily when grinding at this steep angle. It must be remarked, however, that the amount of penetration was extremely small, even with the long arms in these most adverse conditions, and a second important feature is that much of the dust cloud was drawn back into the system after having penetrated the air curtains.

Certain observations were also made at the points where the vertical extraction ducts meet the work rest. Some turbulence appeared, caused by the vertical curtains of the side duct meeting the downward flow of the primary stream from the wheel face, and doubtless somewhat aggravated by the effect of the air stream going into the front hopper. Fig. 18 shows this effect although in no case was the turbulence sufficient to cause a leakage of dust from the system. During the experimental work on the long arms the wheel was used to grind wood and the smoke streams were photographed giving results similar to that shown in Fig. 19. The main cloud is under good control, but smoke can be seen leaking from the dust collector on the left and being taken into the extraction system from a position above the long arms.

Fig. 20 is a close-up view of the system showing good dust control, and the primary stream can be seen as it enters the slot in the long arm remote from the camera. A more general impression of the dust control achieved may be obtained from Fig. 21.

Dust Control with Nozzles

A further series of observations were made on the nozzle equipment. A comparison of Fig. 22 and Fig. 23 with Fig. 25 will show that both top and bottom exhaust was necessary to control the dust. The effectiveness of the nozzles can be seen from Fig. 23, in which the hopper fan was not working. The dust from the work rest, and probably some from the leaking dust collector, has been lifted into the exhaust system by the movement of the ambient atmosphere as it supplied air to the nozzles. As in the case of the long arms, observations were made when grinding wood and in one case titanium tetrachloride was used. The photographs obtained conformed in pattern to the dust streams already discussed.

Very heavy dust clouds occasionally burst through the air curtains and rose above the level of the nozzles. Fig. 24 shows the worst case observed. Even here, however, the dust cloud did

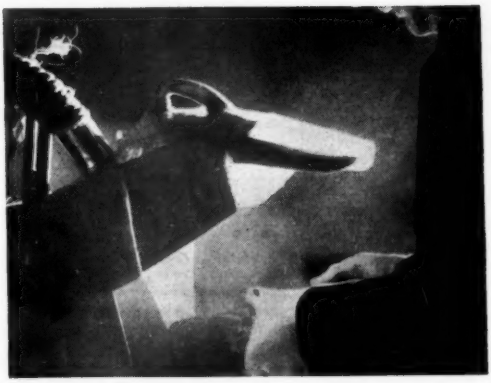


FIG. 15.—*Cardboard External Hood taken with the Vacuum Cleaner Exhaust System operating.*

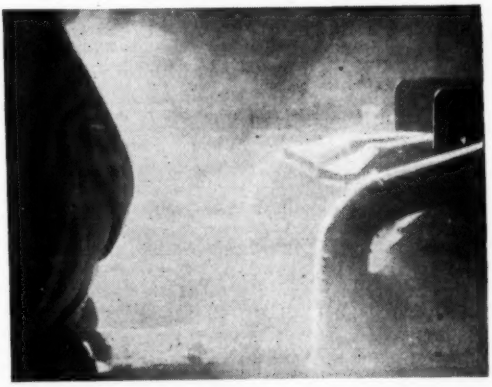


FIG. 16.—*Grinding Rusty Sand-cast Pig-iron without any Local Exhaust Ventilation System working.*

FIG. 17.—*External Extraction System to the Grinding Wheel fitted with Long Arms (Exhaust System fully operative and showing some penetration of the Air-curtain when Grinding at an Angle).*

TABLE II.—*Owens Jet Samples taken on April 2, 1952, when Long Extraction Arms were fitted to the Apparatus.*

Samples in dust stream.		Samples in breathing zone.	
Group No.	Particles per ml.	Group No.	Particles per ml.
4½	2,400	—	—
4	1,600	3½	1,200
5½	4,800	3	800
5	3,200	2½	600
Average, 3,000		Average, 870	

TABLE III.—*Owens Jet Samples taken on April 3, 1952, with Long Extraction Arms fitted.*

Samples in dust stream.		Samples in breathing zone.	
Group No.	Particles per ml.	Group No.	Particles per ml.
4½	2,400	3	800
6	12,800	2½	600
6	6,400	2	400
5	3,200	2	400
Average, 6,200		Average, 550	

TABLE IV.—*Owens Jet Samples (3.4.52) taken with Nozzles fitted.*

Samples in dust stream.		Samples in breathing zone.	
Group No.	Particles per ml.	Group No.	Particles per ml.
*2	400	—	—
2	400	—	—
2	400	—	—
6	12,800	2½	600
4	1,600	2	400
6	6,400	2	400
†2½	600	—	—
5	3,200	2	400
Average, 3,250		Average, 450	

* Four (and †, two) samples taken under the local exhaust-ventilation system in order to find the main dust stream.

TABLE V.—*Thermal Precipitator Samples (3.4.52) taken with Long Extraction Arms fitted. General Atmosphere—218 Particles per ml.*

Samples in dust stream (particles per ml.)	Samples in breathing zone (particles per ml.)
1,331	320
3,640	276
16,241	442
Average, 7,070	Average, 346

TABLE VI.—*Thermal Precipitator Samples (3.4.52) taken with Long Extraction Arms fitted. General atmosphere—170 Particles per ml.*

Samples in dust stream (particles per ml.)	Samples in breathing zone (particles per ml.)
9,109	336
15,881	541
15,435	281
15,398	350
Average, 13,705	Average, 377

TABLE VII.—*Thermal Precipitator Samples (14.5.52) taken with Long Extraction Arms fitted. General atmosphere—128 Particles per ml.*

Without exhaust (particles per ml.)	With exhaust (particles per ml.)
49,244	1,079—sample taken at level of long arms

TABLE VIII.—*Thermal Precipitator Samples (15.5.52) taken with Long Extraction Arms fitted. General atmosphere—79 Particles per ml.*

Without exhaust (particles per ml.)	With exhaust (particles per ml.)
63,553	Samples in breathing zone of operator (above top exhaust system): 522—sample taken 14 in. above arms, forehead level 342—sample taken 11 in. above arms, nose level 452—sample taken 5½ in. above arms, chest level
	Samples in extraction system (below top exhaust system): 565—sample taken at level of long arms 426—sample taken at level of casting (on operator's belt)

TABLE IX.—*Thermal Precipitator Samples (3.4.52), Nozzles fitted. General atmosphere—300 Particles per ml.*

Samples in dust stream (particles per ml.)	Samples in breathing zone (particles per ml.)
3,895	291
32,241	221
50,774	568
40,216	768
Average, 31,781	Average, 462

TABLE X.—*Thermal Precipitator Samples (14.5.52), Nozzles fitted. General atmosphere—128 Particles per ml.*

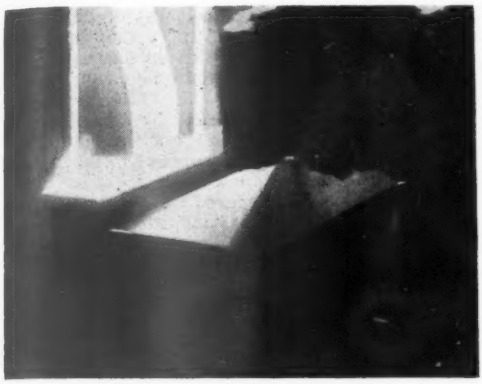
Without exhaust (particles per ml.)	With exhaust (particles per ml.)
49,244	3,177—sample taken level with nozzle

TABLE XI.—*Thermal Precipitator Samples (15.5.52), Nozzles fitted. General atmosphere—79 Particles per ml.*

Without exhaust (particles per ml.)	With exhaust (particles per ml.)
39,167	Samples in breathing zone of operator (above top exhaust system): 468—sample taken 14 in. above nozzles, forehead level 600—sample taken 11 in. above nozzles, nose level 680—sample taken 5½ in. above nozzles, chest level
	Samples in extraction system (below top exhaust system): 400—sample taken at level of nozzles 12,245—sample taken at level of casting (on operator's belt)

TABLE XII.—*Thermal Precipitator Samples taken in Dust-stream leaking from Dust-collector; Instrument placed 16 in. above Floor and near to Wall of Dust-collector.*

Sample No.	Dust concentration (particles per ml.)
28	1,226
30	1,980
34	3,027
37	2,883
39	2,436
41	2,582
43	1,672
45	1,407
47	3,825
50	2,481
53	1,809
55	1,180
	Average, 2,209



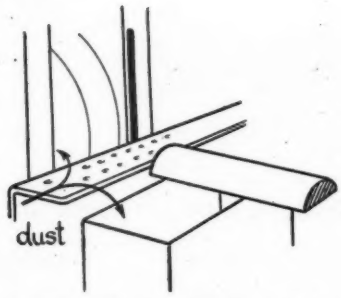


FIG. 18.—*Photograph and Diagram of the External Extraction System (Exhaust fully operative, showing Dust-flow into the bottom of the Vertical Duct and Front Hopper as work is withdrawn).*

not reach the breathing level of the operator, and was almost immediately drawn back into the nozzles. This effect can be seen in the film. Fig. 25 indicates the dust control normally achieved even in conditions of gross overload.

Dust Determinations

In addition to the observation of the movement of air-borne dust under the influence of the exhaust system, a series of dust counts was also made. Both the Owens jet counter and the thermal precipitator were used in this work, the thermal precipitator samples being counted in standard conditions after incineration. The results are given in Tables II to XIV.

Samples were taken in pairs with both instruments, one sample of each pair being taken at the breathing level of the operator whilst the corresponding sample was taken below the air curtain and just above the work, *i.e.* at a point between the wheel face and the operator's body. As a result each pair of samples show the dust concentration at the breathing level of the operator in contrast with the concentration of the primary stream.

It will be seen from Fig. 1 and Table I that the velocity of the air stream at the sampling point below the air curtain varied from 800 to 3,000 ft. per min. This is a high velocity in which to sample so that the dust counts obtained at this point may not be accurate even though they indicate the dust concentration present. The thermal precipitator is, of course, the standard dust-sampling instrument, but it should not be forgotten when using these results that it has only been calibrated in air streams up to 600 ft. per min.[6].

TABLE XIII.—*Summary of Results. Long Extraction Arms fitted. Thermal Precipitator Samples.*

Samples in dust stream (particles per ml.)	Samples in breathing zone (particles per ml.)
1,331	320
3,640	276
16,241	442
9,109	336
15,881	541
15,435	281
15,398	350
63,553	522
—	342
—	452

A second point of some importance arises from the visual evidence that the dust clouds leave the wheel in definite streams. It follows therefore that the sampling instrument in the dust cloud may not have been placed in the main stream and so may not represent the maximum concentration that was in fact being given off by the work.

It will be seen from Figs. 8 and 19 that dust was leaking from the dust collector adjacent to the stand grinder, and it has already been remarked that this dust, on occasions, moved across the front of the grinding wheel in such a quantity as to render observation and photography quite impossible. It follows therefore that the concentrations measured at the breathing level of the operator may be influenced by this erratic dust cloud. The presence of this dust cloud would therefore increase the breathing level concentration recorded and so make the extraction system appear to be less efficient than it really was.

The dust counts were taken in the normal fashion in ordinary lighting conditions, so that the dust being sampled was invisible. It appears, however, from the whole of the work, that dust ought to be sampled under illumination which renders it visible, particularly if the general locus of the dust streams generated by the process are not known. In the present work this general direction of dust movement was known from the film and so the point may not be of great moment, but it is not difficult to envisage processes where a slight movement of the operator's head would completely change the dust concentration he is breathing. In such cases a dust count taken in ignorance of the position of the high concentration dust streams may or may not represent the dust cloud being inhaled.

Every effort was made to complete the dust sampling when no other work was proceeding in the room, and generally speaking this was achieved. Certain work, however, had to be done during the period of the tests, with the result that other machines in the room were used occasionally and

FIG. 19.—*External Extraction System (Exhaust fully operative—showing Control of Smoke from Grinding of Wood and Leakage from Dust-collector moving across from the Left-hand Side).*

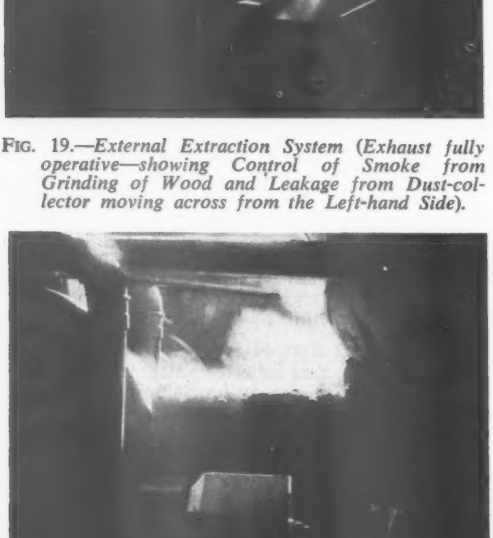


FIG. 20.—*Close-up of the External Extraction System (Exhaust fully operative—showing Dust flowing into Long Extraction Arms).*

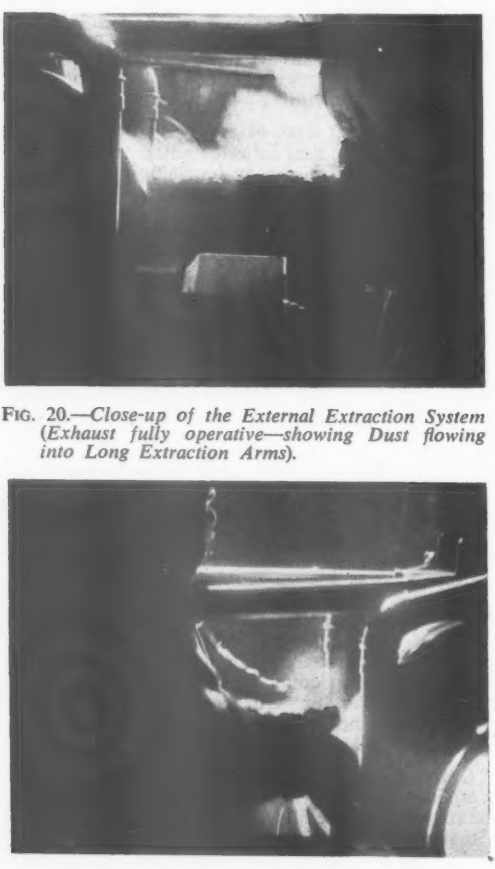


FIG. 21.—*External Extraction System (Long Extraction Arms fitted and Exhaust fully operative—showing Normal Dust Control).*

for short periods. These machines doubtless contributed dust to the general atmosphere and probably account for the variations in dust concentration given by the general atmosphere samples.

Tables II, III and IV show the Owens jet counter samples which were estimated by Lawrie's technique.[7] These samples were not incinerated and so contained dust which was present in the ambient atmosphere as well as that which might have been given off by the grinding process. In view of the visual evidence which has indicated quite clearly that the dust is evolved in definite streams, it is of interest to note in Table IV that the first four samples which were taken under the air curtain show divergent results. It appears that the fourth sample was the only one which picked up the main dust stream. A similar result appeared in the last two samples which were also taken under the air curtain. In this case it seems that the first sample missed the main dust stream, whilst the second one collected part of it.

The Owens jet samples are averaged in Tables II, III and IV. It will be seen that the average breathing level concentration varied from 450 to 870 particles per ml., whilst the average concentration of the cloud evolved from the wheel varied from 3,000 to 6,200 particles per ml. Tables II and III show the results obtained when using the long arms, and Table IV those given by the nozzles.

The thermal precipitator results are given in Tables V to XIV. Samples were taken in different positions and in a variety of operating conditions. Table XII shows the concentration of the dust cloud leaking from the dust collector and it will be seen that this cloud was fairly constant with a concentration of about 2,200 particles per ml. The thermal precipitator counts which were taken in the dust streams from the wheel show a considerable variation, just as the Owens jets counts did. Undoubtedly the concentration of this stream varied from time to time, but the visual observations suggest that many of these great variations were due to the movement of the dust in definite streams so that the sampling instrument may, or may not, have collected the main dust stream, according to its position. It appeared also that a very slight movement of the instrument, a matter of an inch or so, made a very great difference to the dust concentration recorded. This suggests that the samples would have been better taken in conditions in which the dust was visible instead of by the normal method in ordinary daylight.

A summary of the results is given in Tables XIII and XIV, where the concentrations found in the dust-streams are compared with those found in the breathing zone of the operator. The new external extraction system maintained a breathing zone concentration of less than 750 particles per ml., even when the cloud generated at the wheel rose to over 63,000 particles per ml.

Conclusions

(1) It has been shown that the phenomena found on a grinding wheel running with a peripheral velocity of 9,000 ft. per min., which were described in a previous paper, also appear on a wheel running at a peripheral velocity of 5,000 ft. per min.

TABLE XIV.—*Summary of Results (Nozzles fitted. Thermal Precipitator Samples).*

Samples in dust stream (particles per ml.)	Samples in breathing zone (particles per ml.)
3,895	291
32,241	221
50,774	568
40,216	768
39,167	468
—	600
—	680

(2) The primary dust stream which flows down the face of the rotating wheel, and sundry secondary air-streams which develop therefrom have been photographed by means of a ciné camera.

(3) The necessity for dust-tight dust collectors has been shown by photographs of a dust cloud of about 2,000 particles per ml., which was found to be leaking continuously from a collector unit which was under pressure from the fan.

(4) It has been found that, in cases where the dust moves in well-defined streams, dust samples taken in standard conditions when the dust is invisible, may give erratic results. It appears that these variations in the results are often due to the fact that the instrument may fail completely to sample the main dust-stream, and may be collecting from a much cleaner air-stream moving alongside the dusty stream. It appears, therefore, that visual dust observations are desirable to supplement dust counts.

(5) Observations have shown that the dust control achieved by the new external exhaust system is superior to that obtained by the conventional method of ventilation, in the experimental conditions imposed. Even when heavy dust clouds momentarily burst through the high-velocity air-curtains, the dust was quickly recaptured by the system.

(6) Observations have suggested that the nozzles are at least as good, if not better than the long extraction arms.

(7) Thermal-precipitator dust-counts have shown that the new system is capable of controlling dust clouds so that the breathing zone concentration remains below about 750 particles per ml., even when the cloud generated is of the order of 60,000 particles per ml. In these conditions of gross overload the average breathing-zone dust concentration lay between 400 and 500 particles per ml.

Acknowledgments

The system was developed and tested at the instance of the Foundry Atmospheres Committee of the British Cast Iron Research Association, and the Joint Standing Committee on Conditions in Iron Foundries of the Ministry of Labour and National Service. The Authors are very greatly indebted to Mr. Colin Gresty for his most encouraging support as chairman of the Foundry

FIG. 22.—*External Exhaust System fitted with Nozzles (Exhaust applied to the Hopper only. Dust rising behind Operator).*

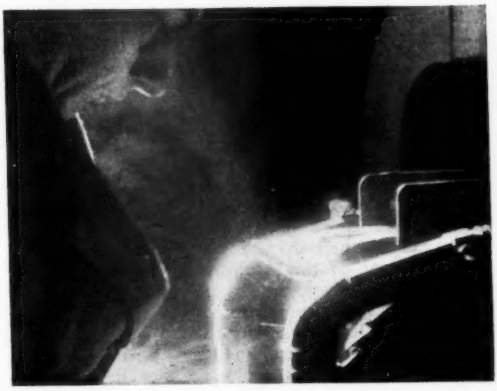


FIG. 23.—*External Exhaust System fitted with Nozzles (Systems working with the Exhaust applied to the Nozzles and Vertical Ducts only).*

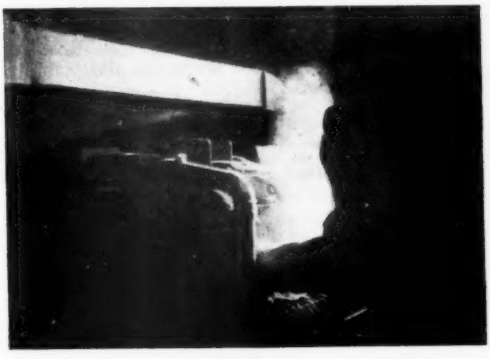


FIG. 24.—*External Extraction System, with Nozzles fitted and the Exhaust fully operative (a rising Burst of Dust was recaptured).*

FIG. 25.—*External Exhaust System with Nozzles fitted and the Exhaust fully operative (showing Normal Dust Control).*

Atmospheres Committee and of the Technical Subcommittee of the Joint Standing Committee on Conditions in Iron Foundries. Their acknowledgment is also due to Dr. J. G. Pearce for the facilities at the British Cast Iron Research Association which he provided so freely. The drawings were done by Mr. W. H. Kerry and Mr. J. E. Stevenson, of the Factory Department, Ministry of Labour & National Service, and the photographs were taken from the film which was made with the expert assistance of the staff of the Photographic Reproductions Branch of the Air Ministry. The Authors gladly accord their thanks for this assistance.

Finally, one of the Authors[a] gratefully acknowledges his indebtedness to Sir George Barnett, H.M. Chief Inspector of Factories, for permission to engage in the work and to publish the results; and records with pleasure his gratitude to Mr. H. A. Hepburn, H.M. Deputy Chief Inspector of Factories, for his unfaltering interest in the work and his persistent kindness. He is also under obligation to Mr. J. E. Stokes and Mr. J. F. Chambers, of Qualcast (Ealing Park), Limited, for permission to count some of the dust slides on the firm's microscope; and to Mr. F. M. Shaw and Mr. J. Bright, of the British Cast Iron Research Association, for assistance whilst the dust samples were being collected.

REFERENCES

[a] Private communication from Mr. H. H. Watson.
[7] Second Report of the Dust in Steel Foundries Committee. Appendix 2, H.M. Stationery Office, London, 1951.
[8] W. B. Lawrie.

MR. DONALD M. WOODLEY, deputy chairman and joint managing director of Keith Blackman, Limited, announces that his firm is making every effort to maintain existing selling prices despite the recent increased wage awards, and the extra prices already being asked by various suppliers. He expresses the hope that, in the interests of national economy, other firms will pursue a similar course.

Foreign and U.K. Iron and Steel Prices

The latest comparison of British, Continental and overseas iron and steel prices made by Darby & Company, Navigation Street, Birmingham, 2, shows that Britain still sells at lower prices than most of her competitors.

The table below gives the prices at which foreign engineers buy specified products in their own home markets. Prices in the home markets of some countries may be very different from the export prices, which are more often quoted. All prices shown are net, per 2,240 lb. delivered to a typical consuming point and including a reasonable rail carriage, but for this reason, in large countries especially, there will be some prices both higher and lower. All prices are for basis sizes and for the qualities stated and have been calculated at current rates of exchange.

The first three prices are delivered to Black Country Stations; bars and plates to the Midland area. Figures are for Durham coke, Class 2 pig-iron of 1.0 to 1.5 per cent. minimum phosphorus, untested grade billets, and ordinary mild-steel bars and plates. For the U.S.A. and Canada in each case figures have been calculated for delivery to substantial consuming point in the eastern area.

	Foundry coke.	Foundry, Cl. 2 pig, high phos.	Re-rolling M.S. billets, 2½ in.	M.S. merchant bars, basis 1 in.	M.S. plates, ¼ in. basis.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Gt. Britain	6 17 5	12 17 3	25 4 6	32 4 6	31 16 6
Belgium	10 12 0	30 2 0	31 8 0	30 0 0	33 14 0
Germany	—	—	31 4 0	35 18 0	43 6 0
Canada ..	12 18 9	25 13 6	38 14 0	41 0 0	41 0 0
S. Africa	3 2 9	16 2 0	35 12 0	38 6 0	39 9 0
U.S.A. ..	9 12 0	21 1 6	22 2 9	33 1 0	32 12 6
		C.I. scrap 17 10 0			

Cobalt Distribution Plans Discontinued

It has been announced by the manganese-nickel-cobalt committee of the International Materials Conference that an improvement in the supply position of cobalt made it unnecessary to recommend the adoption of distribution plans for the metal for the first quarter of 1953. The 14 member governments of the committee concurred in this decision. The committee would continue to keep the supply-demand picture of cobalt under review, however, in accordance with its terms of reference. Governments were assured that the discontinuance of allocations for cobalt did not imply the termination of international consultation regarding the commodity.

When cobalt was first allocated in October, 1951, for the fourth quarter of that year, actual production of cobalt metal, oxides, and salts amounted to 2,100 metric tons of cobalt content, whereas production for the first quarter of 1953 was estimated at more than 2,800 metric tons. Further increases in production were expected.

The 14 countries represented on the committee are:—Belgium, Brazil, Canada, Cuba, France, the Federal Republic of Germany, India, Italy, Japan, Norway, Sweden, the Union of South Africa, the United Kingdom, and the United States.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

IRON AND STEEL BILL

From the COUNCIL OF IRONFOUNDRY ASSOCIATIONS
To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—It is scarcely to be expected that members of the C.F.A. will feel grateful to Mr. Nicholls for his unmeasured attack upon their organization in your issue of December 4. There is a minority of members and non-members which is opposed to the Bill, however, and it is doubtful whether a statement more damaging to that minority's case could have been devised than the letter which you publish. To that extent, therefore, the substantial majority of members who support their Council may perhaps after all find it in their hearts to thank him.

Mr. Nicholls asks whether the C.F.A. was acting unconstitutionally in speaking on behalf of a large section of the ironfounding industry who are not members, and, therefore, unrepresented by it. The C.F.A. is often consulted by, and frequently is of help to, non-members, but in all matters connected with the Bill, it primarily speaks for those in its ranks. They form a substantial part of the industry—so far as I am aware, the greater part counted as individual foundries, and certainly overwhelmingly the greater part judged by tonnage. The Council does not fear criticism, indeed it invities it, as Mr. Nicholls will have found in his careful reading of "To Make Your Voice Heard" (p. 8). As Mr. Nicholls points out, "To Make Your Voice Heard" was issued to all iron foundries over a year ago. It is far too late now for non-members to claim a right to be heard in the organization, when events are taking a turn that some of them do not like, or have failed to consider in good time.

Your correspondent wants to know if the inclusion of ironfounders in the Bill means that the C.F.A. has not been powerful enough to prevent Government interference in the industry. This question, like others that Mr. Nicholls asks, obscures the whole issue by the use of the word "interference." There is no justification in anything that the Government has said for the supposition that the Board will "interfere." Mr. Nicholls' letter is dotted about with words used in the same loose sense. He speaks of State "control," and of a "Control Board of Governors." He rubs it in with yet another reference to a "Government Control Board" later on. His letter is like a man who shouts in an effort to carry conviction. The Board, if the Bill be studied with reasonable care, will plainly be seen to be neither a "State" Board nor a "Control" Board.

It may be worth the while of non-members, however, to reflect upon their position had there not existed an organization to represent their interests to the Minister. They would then have been utterly alone, outside the front door, confronted with a Board whose dominant interest would very naturally have been that of the steel industry. That industry's organization, like the C.F.A., has assisted the Government in improving the Bill, but has had the good fortune to be spared constant sniping by a minority. Had the C.F.A. adopted an attitude of blank negation, iron castings would have been "in" just the same, but "in" in the way other industries, or the Government, thought fit—without consultation or power to manœuvre. The C.F.A. has a sense of responsibility to the industry and the country. If some non-members cannot see that "it is impossible, under modern conditions, for industries to live unto themselves and to try to manage their affairs divorced from the country's overall economic policy," they will find it hard to see anything. The words quoted are those of an outstanding exponent of private enterprise, Lord Bruce of Melbourne, and they appear, as Mr. Nicholls will have observed, on p. 1 of "To Make Your Voice Heard."

In his address on October 9 to the annual convention of the Joint Iron Council (in which the C.F.A. is an equal partner), the president of that body quoted from a statement to the Minister made by the J.I.C. in these words: "The national interest demands that a fair balance should be maintained between the steel industry, with its annual production of some 16,000,000 ingot tons, and the ironfounding industry with its output of some 4,000,000 tons of castings. This is particularly necessary in relation to the raw-material requirements of the two sections, and the Board's organization should be such as to ensure that the iron industry is treated as a separate industry and not considered as ancillary or subservient to the steel industry." That is the position now, and it could not have been maintained without the C.F.A., Bill or no Bill.

On the issue of prices, Mr. Nicholls is entirely in error. The C.F.A. has the best reason to believe that the Minister has agreed to withdraw from the Board the power of extended price control without his consent and without his prior consultation with the industry. The Minister of Supply has far greater powers of price control at this present moment than those now given in the Bill, and he explicitly stated in the House of Commons on October 23 that few, if any, foundry development schemes will come within the scope of the Board. The concern of the Board is with developments likely to alter the whole structure of the industry; as the Minister has said, it is "big expansion schemes in the heavy end of the industry, costing many millions of pounds," that may be affected, not an additional bench or bay in a moulding shop.

Mr. Nicholls affirms that the "Board of Governors" will relieve the C.F.A. of any useful purpose in securing the industry's rightful share of its raw materials. This is simply guesswork. If, indeed, the Board proves able to ensure the constant, regular and fair supply of raw materials to the ironfounding industry, no doubt he would, as we should, rejoice wholeheartedly. Here I may ask him a question: Is that happy result not more hopeful of attainment providing that the ironfounding industry is represented on the Board, as indeed, it will be? The representation will be the more effective for the fact that the ironfounders are organized in the C.F.A.

Under the former Board, known for short as the Forbes Board, there was no question of the industry being "an extension of a Government department," as Mr. Nicholls affirms will now be the case. In fact there is no question of it now. It is up to the industry. If all non-members were to do their duty and enrol in their appropriate Associations, which are constituent bodies of the C.F.A., there would be still less likelihood of effect being given to this entirely hypothetical assumption. The part of the industry represented by the C.F.A. is too progressive to attract unwelcome attention from the Board, thanks to the devoted and unpaid work of so many ironfounders who take their full share in the activities of the Council. H.M. Chief Inspector of Factories wrote in his Annual Report for 1950: "It can be said with confidence of ironfounding managements that hardly any other industry has reacted so wholeheartedly to such radical changes in production methods and working conditions as has been experienced in foundries over the past few years

Correspondence

in Great Britain, and from which will inevitably result healthier and better working conditions in what is basically a difficult industry in comparison with others." An unsolicited testimonial of that kind is the best guarantee of non-interference from any Board, and tne statement Mr. Nicholls makes that in its present form the industry will be deprived of initiative and have everything planned for it is a mere travesty of the facts, a "turnip ghost" set up to cause despondency and alarm.

Mr. Nicholls writes of the Board as though it were an instrument unique in the nation's experience. If he carries his researches further, he will find that there is a mass of legislation. This legislation does not specifically deal with ironfounding; it covers the entire economy of the country, giving to Government rights over persons and property unknown before the war. This legislation will continue to exist whether the Bill passes into law or not, and it could be used, if a Government ever so desired, to wield immense powers over any and every industry.

There is no contradiction, implicit or explicit, between the statements made in "To Make Your Voice Heard," and the policy adopted by the C.F.A. in regard to the Bill. Every ironfounder in the country has been informed, in a letter of which the terms are the same as in the one which you, Sir, published in your issue of November 27, of the course of events which led up to the formulation of the C.F.A's policy and the reasons for adopting it. What Mr. Nicholls reads into statements in the national Press are his own affair; I shall not discuss his guesses at their meaning. His letter is, however, conclusive proof that the place for ironfounders is inside the C.F.A., and not outside it.

The Bill, as amended in accordance with representations made by the C.F.A. through the J.I.C. will, in all probability, before long become law. When the fact is apparent that the measure provides a simple, workable, and fair solution of a great political and economic problem, the emotional antagonism to it will die down. The more stinking fish cried in these early days, the greater the incitement to the Opposition to seize upon imagined weaknesses in the industry as an excuse for mischievous interference that we all abhor.

Whatever may be its merits or demerits, the Bill can do the industry no harm as an Act, if ironfounders close their ranks, rally round their organization, and so enable the C.F.A. to go on "making their voice heard" in tones of authority.—Yours, etc.,

N. P. NEWMAN,
Chairman,
The Council of Ironfoundry Associations.

Crusader House,
14, Pall Mall,
London, S.W.1.
December 8, 1952.

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—It is very interesting to see that in your issue of November 27 the Council of Ironfoundry Associations, in 3½ columns, says that it has acted consistently—but has it acted wisely?

1. If the Bill goes through, it has made the ironfoundries subject to *permanent* supervision—that is, supervision for all time. The foundries previously have never been subject to anything except *temporary* supervision.

2. The C.F.A. has explained that it did this in order to make sure of adequate raw material supplies to the foundries. It is admitted now that there is no need to come under the Bill to secure this protection. It is to be the duty of the Iron and Steel Board to keep under review "the arrangements for procuring and distributing raw materials and fuel for use in the iron and steel industry." If this is not clear enough, let the Government add on to this clause "including supplies for iron castings." It is much better that this should be one of the general duties of the Board rather than that the foundries rely on one ironfounder on a Board of 11 other members. Shall we say there will be three "steel" members on the Board, and you have straightway a strength of three for steel to one for iron castings.

3. Under the Bill, iron castings are to be subject to supervision. Drop forgings are expressly stated to be outside the scope of the Bill. There is no mention of steel pressings, steel stampings, steel fabrications, welded steel, but all these are free from supervision. As readers know, they are keen competitors with iron castings; is it British justice that iron castings should be treated differently from these other products?

4. Mr. Attlee says, Mr. Morrison says, Dr. Dalton says, and so does Mr. Strauss (late Minister of Supply), that when Labour is once again in power they will again nationalize steel. As recently as last Tuesday, Mr. Strauss (Labour) said among other things:—

> "Nevertheless, the present Government have decided that to ensure adequate public supervision over this industry, these 2,400 firms must be brought in. We shall have to consider that situation when we re-nationalize the industry. It will be difficult to ignore the views of H.M. present Government on this matter. If we bring into the scope of the re-nationalized industries some or all of these firms, we will be fortified by the knowledge that the then Tory opposition cannot logically oppose us. It is no doubt just because many founders and re-rollers have appreciated this that they are so violently opposing the Government on this aspect of the proposals. Probably their condemnation of the Government is even more vehement in private than it has been in public. I sympathize with them, when they criticize the Government for putting these foundries and re-rollers, many of which are only part of an engineering works, under the proposed Board. It is because at that time we shared their view that we did not do so. Now we are told by the Conservative party that we were wrong, and that they should be in. As that conclusion comes from the party whose motto is "Set the people free and reduce the shackles on industry," we are impressed. When we come to re-nationalize the industry we may feel impelled to act on their advice."

In other words, the Labour party says that the action of the present Government may give them support for nationalizing all foundries at some future date when they are again in power. I believe the risk goes even further than this. I think if the Labour party at some future date thinks fit to nationalize foundries, they may decide to go even further and nationalize some branches of engineering. This is a prospect which has no attraction for us at any rate, and so I feel that now is the right time to try and persuade the Conservative Government not to bind up the foundries with steel, blast furnaces, etc., and so my query—Has the C.F.A. acted wisely?—Yours, etc.,

pp. BLAKEY'S BOOT PROTECTORS, LIMITED,
T. WHITHAM,
Managing Director.

November 28.

BASIC- AND ACID-ELECTRIC STEEL

To the Editor of the FOUNDRY TRADE JOURNAL

(Slightly abridged by the Editor)

SIR,—The article by L. W. Sanders which you publish in the current issue of the FOUNDRY TRADE JOURNAL, refers to the acid-electric melting of steel as being new to him and one that has previously been a difficult operation. It is surprising that such a statement should be made, as the acid process is by no means new, and the writer, himself, actually operated this process in 1936-37 with a 3-ton electric "Héroult" furnace having a 5,000 k.v.a. transformer wnich melted a 3-ton charge in 50 minutes. This charge was then transferred to a 7-ton Héroult furnace, which was used as a receiver, and steel was poured continuously for eight hours.

The information in the whole article is in no way original and seems to consist of a series of obvious statements. For example, in his section on basic melting he states: "the final addition of ferro-silicon and ferro-manganese is made to bring these elements to the desired composition. The additions are allowed to melt. . . ." He also seems to regard it as worthy to note that in a 3-ton furnace a 3-ton charge is melted in 100 minutes. In the 1920's the writer operated a 1½-ton Héroult furnace which melted a 2-ton charge in the same time, and which produced every type of alloy steel, including stainless steels and high-speed tool-steels (18 per cent. tungsten, 4 per cent. chromium, 1 per cent. vanadium).

Again, in the section on the mechanical and electrical considerations, Mr. Sanders stated "that the power input on an arc furnace is absent during the fettling and charging." Really, we could also add that the power input is absent when electrodes are being adjusted.

In his remarks on basic melting he stated in one paragraph that "heavy scrap is laid first in the bucket, followed by the lighter type of scrap, the crushed turnings being on top, these falling directly under the electrodes," yet in almost the next paragraph but one he states "that the scrap is so arranged in the drop bucket that the heavy scrap falls directly under the electrodes." He should make his mind up. The first statement gives the correct procedure; the second is absurd.

We are also told that, concerning the acid furnace, "the charge is packed very compactly and enables the operator to maintain sulphur and phosphorus only slightly above that of basic steel." This is news indeed because I have always believed that under the acid slag sulphur and phosphorus were stable and required no maintaining. Perhaps Mr. Sanders will explain in greater detail exactly how the size of charge materials bears any relationship whatsoever to the sulphur and phosphorus content of the melt.

The acid process has been operated successfully for a great number of years and the basic process for an even greater number of years. In brief, the general trend of the article suggests that it is more suitable for a text-book for beginners than for an adult publication such as the FOUNDRY TRADE JOURNAL.—Yours, etc.,

W. BARNES.

"Fellowdene," 95, St. James's Road,
Dudley, Worcs.
December 1, 1952.

[The first "acid" melting furnace personally seen was in Barnsley during, or just after, the 1914 war. It is thought that the Snyder furnaces operating in the National Steel Foundry at Leven and at Summerson's foundry during the same period were acid-lined.—EDITOR.]

COST CLINIC

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—We read with considerable interest the report in your issue of October 16 on the "Cost Clinic" conducted by the Association of Bronze and Brass Founders at the recent conference in Harrogate.

In their review of the various entries submitted, the adjudicators described our method of price estimating as being almost technically perfect except for a "disappointing" failure to departmentalize overhead expenses. In fact, however, we do—and always have departmentalized overhead expenses (as is evident from that part of your report which refers to die-sinking)—but it so happens that the budgeted overhead rates for our Number 1 foundry and dressing department are so nearly similar that we decided to use a common rate in order to reduce the very considerable volume of calculations required in evaluating estimates, standard production costs, work in progress, etc.

It was this latter "short cut" which caused the adjudicators, quite understandably, to assume that we had not allocated overheads by department. It is the rather unexpected publicity given to the proceedings at Harrogate and in no way the adjudicators' decision which has occasioned this letter. The pride which we take in our estimating and standard cost system, and the desire to correct any wrong impression which readers might have gained from your published report has prompted this explanation.—Yours, etc.,

E. BROOKS,
Sales Manager.

Aluminium Bronze Company, Limited,
Wallows Lane,
Walsall.
December 1, 1952.

Spheroidal-graphite Cast Iron

The Mond Nickel Company's British Patent No. 630,070, covering the production of spheroidal-graphite cast iron by the magnesium process, has now been granted. This grant is the culmination of long proceedings before the Patent Office and the Patents Appeal Tribunal.

The application for this patent was made in March, 1947, and in May, 1948, the first public disclosure of the process was made simultaneously in Great Britain and the U.S.A. In October, 1949, the application was accepted by the British Patent Office, and published. Opposition to grant of the patent was lodged by the Meehanite Metal Corporation on the grounds that the invention had been disclosed in certain prior publications, and that the nature of the invention and the manner in which it is to be performed was not sufficiently and fairly described in the specification.

In June, 1952, after protracted proceedings, the Patent Office gave its decision agreeing to seal the patent. Appeal against the decision was made to the Patents Appeal tribunal, and the hearing before this tribunal took place on November 10 to 12, 1952, when Mr. Justice Lloyd-Jacob directed that the patent should be granted. This final decision clarifying the patent position will be particularly welcome to the numerous licensees of the Mond Nickel Company, who are actively engaged in the manufacture of spheroidal-graphite cast iron by the magnesium process. Similarly for engineers it will remove all doubts about the sources of supply of this material.

FIFTY MEMBERS of the Derby Society of Engineers paid a visit to the British Railways, Staff Training College, Derby, yesterday.

Personal

PROF. SIR JOHN LENNARD-JONES is to become principal of the University College of North Staffordshire in succession to the late Lord Lindsay of Birker.

MR. GEOFFREY M. FLATHER, joint managing director of W. T. Flather & Company, Limited, Standard Steel Works, Sheffield, and a former Master Cutler, is leaving shortly for South Africa.

PROFESSOR PORTEVIN has received the Seaman Gold Medal of the American Foundrymen's Society from the hands of Mr. James Dunn, the United States Ambassador to France.

MR. J. HARVEY, of 273, Broadstone Road, Heaton Chapel, Stockport, has relinquished his position with Harvey & Longstaffe, Limited, to commence business in partnership with Mr. V. Alfieri under the name of the Pressurecast Pattern Plate Company.

TO CELEBRATE 50 years' service with Ley's Malleable Castings Company, Limited, Derby, MISS E. M. BEATTIE, of the wages department, was presented with a television set by Mr. F. D. Ley, managing director, on behalf of the directors of the company.

COL. H. B. EVERARD has been appointed general manager of the nationalized Rhodesia Railways, and will take up his duties at Bulawayo on January 16. Since February, 1949, Col. Everard has been Chief Officer, Engineering Maintenance, for the Railways Executive in London.

MR. J. F. WHITFIELD has relinquished his post as chief engineer of Birmetals, Limited, aluminium alloy sheet manufacturers, etc., of Birmingham, to take up an appointment as general manager of B. Thornton, Limited, engineers and contractors, of Huddersfield.

MR. F. MOORES has been appointed manager of the capacitor department of Johnson & Phillips, Limited, electrical engineers and cable makers, of London, S.E.7. He was formerly employed by British Insulated Callender's Cables, Limited, at the company's Helsby works, where he had been concerned for over 25 years with the capacitor business.

The Southern Regional Gas Board has announced the resignation of MR. OWEN R. GUARD from the chairmanship at the end of 1952. His successor as chairman on January 1, 1953, will be MR. A. R. MCBAIN, who is at present a part-time member of the board and also a part-time member of the Iron and Steel Corporation.

MR. GEORGE W. OUTWIN has retired after 32 years' service with Pilkington Bros., Limited, Kirk Sandall, where he held the position of works safety officer. At a meeting in the staff dining room, on November 28, he was presented with a gold wristlet watch and a fireside chair by Dr. W. L. Patrick. Mr. Outwin was a founder member of the Doncaster branch of the Association of Supervisory Staff and Engineers and Technicians.

CHIEF METALLURGIST to the Dorman, Long & Company, Limited, group, MR. WALTER W. STEVENSON has severed a long association with Tees-side to take up a similar appointment with the Round Oak Steel Works, Limited, Brierley Hill (Staffs). Mr. Stevenson received his early training in the Firth-Brown laboratories at Sheffield, and has specialized in high-grade alloy steels. He is a Fellow of the Royal Institute of Chemistry, a member of the Council of the Institution of Metallurgists and a past-president of the Cleveland Scientific and Technical Institution.

AFTER 30 years as chairman of William Denny & Bros., Limited, the Dumbarton shipbuilders, SIR MAURICE DENNY will relinquish that position at the end of the year. He will, however, continue to serve as a member of the board. At the same time, MR. JOHN M. DENNY and MR. WILLIAM DENNY will retire from the board. It is understood that these three directors, who have all served the company as members of the board for many years, feel that the time has come for their younger colleagues to assume fully the responsibility for the management of the business. It is the intention of the board to invite Sir Maurice to become president of the company as from January 1, with MR. EDWARD L. DENNY as chairman.

MR. JAMES MITCHELL, who was elected a member of the Iron and Steel Institute in 1918, became a member of the council in 1944 and a vice-president in 1946. Since 1949 he has been honorary treasurer. At the Institute's annual meeting recently, it was announced that he had been elected president for the ensuing year. He joined Stewarts and Lloyds, Limited in 1908; he was elected to the board in 1947, and is now managing director of iron and steel production. When the British Iron and Steel Research Association was formed in 1945, he became chairman of the steelmaking panel, acting in that capacity until 1949. The importance of his contribution to the British iron and steel industry was nationally recognized in 1949, when he was awarded the C.B.E. The following year he was awarded the Bessemer gold medal for his contributions to technical development in the iron and steel industry. A founder fellow of the Institution of Metallurgists, he is the author of a number of papers concerned principally with Bessemer and rimming steels.

Obituary

MR. W. S. BARKER, a director of Leach & Thompson, Limited, iron and non-ferrous founders, of Keighley (Yorks), died on November 30 at the age of 48.

MR. CEDRIC CROSTHWAITE, a former director of R. W. Crosthwaite, Limited, ironfounders, of Thornaby-on-Tees (Yorks), died recently at the age of 58.

MR. J. A. PRESTWICH, chairman of J. A. Prestwich & Company, Limited, petrol engine and air-compressor manufacturers, of London, N.17, died recently.

MR. JOHN CAMERON WALLACE, who has died in a Glasgow nursing home, combined an academic career with an interest in industrial activities at home and abroad. A native of Glasgow, he was educated at Edinburgh and Cambridge, where he took an Engineering Tripos with first-class honours. During the first world war he served with the R.E. and gained the M.C. After the war he was appointed a Fellow and tutor of Emmanuel College, Cambridge. Mr. Wallace was a founder director of Metal Industries, Limited, Glasgow, and was also chairman of George Christie, Limited, a post which had been held by his father.

MR. FRANK GURNEY, who was recently appointed home sales manager of Metropolitan-Vickers Electrical Company, Limited, has died after a brief illness. He had been with the company for over 30 years. Mr. Gurney received his engineering training with the Yorkshire Electric Power Company, joining Metropolitan-Vickers in 1919. After a period in the motor sales department, he joined the Manchester district office, being appointed manager of the Stoke-on-Trent office in 1929. He was appointed to a similar post at Leeds in 1933. In 1941 he returned to Trafford Park to take up the post of sales manager of the transformer department, becoming sales manager of the plant department in 1945. He was appointed assistant manager, home sales, in 1949.

Parliamentary

The debate on the Second Reading of the Iron and Steel Bill was resumed on Thursday last week by MR. JOHN FREEMAN (Watford, Lab.), who expressed the opinion that the plan in the Bill for a dispersal of ownership would split the industry. In financial circles it was a matter of comment that there were few buyers about for steel undertakings.

MR. LOW, Parliamentary Secretary, Ministry of Supply, said that there had been many misunderstandings about the effect of the Bill on foundries, and at the request of the Minister he had been interviewing trade associations to explain the Bill to them and to hear their special problems. The members of the Board would be drawn from the production and consuming sides of the industry; the producers would be in the minority, and the consumers would be able to protect their interests much better than a consumer council could.

Trade union leaders would be able to take part in the general policy of the industry without having to become employers. The industry would regard the Board as a policy maker and the Government was sure it would co-operate with them. There would be part-time and full-time members.

Winding up for the Government, the Minister of Housing and Local Government, MR. HAROLD MACMILLAN, referred to the proposed Iron and Steel Board. He said that it had three advantages over the Iron and Steel Corporation. It was more comprehensive, and would exercise powers over the major matters of development, maximum prices, and raw materials. Secondly, it was really a constitutional growth based on the old Board, which worked very well. Thirdly, its character and functions would make it a far better instrument for protecting the interests of the men employed in the industry and all the consumers of its product.

The Bill was a bold, ingenious, and sincere attempt to find a middle way to resolve the conflict between the principle of freedom and the principle of order, said Mr. Macmillan. It would be generally welcomed by people of moderate opinion on both sides of industry.

Grain-refining Mechanisms

A contribution from the British Non-Ferrous Metals Research Association published by the Institute of Metals reports work by W. A. Baker, B.Sc., F.I.M., Myriam D. Eborall, B.A., and A. Cibula, M.A., A.I.M., on the influence of primary particles on the grain-size of cast magnesium/aluminium alloys.

It apears that although the superheating and carbon processes for the grain-refinement of magnesium/aluminium alloys have now been in use for several years, their *modus operandi* remains obscure. The work described was directed towards determining whether the processes were basically similar or dissimilar and whether a nucleating substance was responsible for both, or either, of them. Accordingly, the occurrence of primary particles in alloys of commercial and high purity, and their relation to changes in grain-size, brought about in various ways, were studied. Two types of primary particle were found, one an iron-rich phase, and the other of unknown identity. It was concluded that neither of these types of particle was primarily responsible for grain refinement, but that a nuclear mechanism did operate during both processes. The evidence obtained, although incomplete, was consistent with aluminium carbide being the grain refiner.

Scots Firm's Stand against Union

The strike of moulders, coremakers and others employed in the foundry of Douglas Fraser & Sons, Limited, of Arbroath, has reached a deadlock. The strike, which now affects 65 men, began on November 5 and the dispute arose because a non-member of the union was in a semi-skilled job as a machine moulder. He was formerly a member of the union. The A.U.F.W. is now recognizing the strike action. Mr. Norman Fraser, works director of the firm, last week issued the following statement:—

"The management of this firm not only believe in trade unionism, but are proud of the achievements of British trade unionism. It is a system which, like Parliament, has grown up here and spread to every part of the world. We believe that to this day it operates in no country more effectively than in our own. We are proud, too, of our democratic system in which compulsion is out of place. Parliament has been compelled to adopt conscription to the armed forces, but we do not believe there is any similar necessity in regard to British trade unionism. We are told we can end this strike by changing the employment of the man concerned. To do so for this reason would mean that the moulders could at any time exclude a non-union man by similar tactics. We are not prepared thus to concede the principle that union membership is a condition of employment.

"'Unofficial' discussions have taken place between the Union and the firm, but no compromise has been found. Finally, this strike can ill be afforded by any section of the community. It is costly to the strikers and their supporting funds. Just as surely it reduces the profits of the firm; these are necessary to continue the policy of maintenance, research, modernization and improvement of amenities—not to mention taxation—upon which our welfare depends. At this critical period of world competition, we handicap ourselves also by poor deliveries and distraction of management. Last week, I should have been in the South looking for work for the firm rather than holding myself available for interview by union officials. The rapid end of this strike is the concern of every individual in the community."

£1,000 Damages

George Orr, labourer, of Kilmarnock, whose right eye was injured while he was at work, was awarded £1,000 damages on November 13 by a jury sitting with Lord Birnam in the Court of Session at Edinburgh. Orr claimed £3,000 from Glenfield & Kennedy, Limited, Kilmarnock. He said that in June, when working near men who were removing the rough edges of metal castings, he was struck in the right eye by a piece of metal. He blamed the firm for failing to provide a safe system of working. Denying liability, the firm contended that the accident was caused by Orr's negligence in failing to use goggles which were available to employees.

Foundry Education in Sheffield. A meeting of Sheffield-area founders, industrialists, educationists, and trade union officials was held at the end of last month under the chairmanship of Mr. F. A. Martin, branch president of the Institute of British Foundrymen, when the initial steps were taken to re-establish courses in foundry practice leading to the City and Guilds Examination. This was considered to be necessary to attract youths to the industry, and to give adult craftsmen opportunities to improve their knowledge.

Imports and Exports of Iron and Steel in October

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in October. Figures for the same month in 1951 are given for the purpose of comparison and totals for the 10 months of 1952 and of 1951 are also included. (All figures in tons.)

Total Exports of Iron and Steel by Destination

Destination.	Month ended October 31.		Ten months ended October 31.	
	1951.	1952.	1951.	1952.
Channel Islands	876	624	7,434	5,681
Gibraltar	87	69	705	1,546
Malta and Gozo	327	172	2,748	1,885
Cyprus	418	819	4,088	5,537
Sierra Leone	424	376	4,399	4,230
Gold Coast	1,460	4,646	15,353	30,984
Nigeria	4,901	6,393	45,139	40,464
Union of South Africa	11,165	9,961	112,126	112,495
Northern Rhodesia	2,674	2,885	14,136	23,835
Southern Rhodesia	3,423	7,683	32,321	47,808
Tanganyika	1,674	2,005	14,630	17,733
Kenya	2,803	4,470	40,011	36,419
Uganda	946	775	5,068	5,663
Mauritius	629	403	5,628	4,765
Bahrein, Qatar, and Trucial Oman	244	2,746	6,051	15,879
Kuwait		1,353		12,180
India	7,473	7,345	74,978	62,437
Pakistan	7,034	4,913	64,248	58,924
Malaya	5,585	7,972	61,711	63,477
Ceylon	2,398	2,121	22,687	19,093
North Borneo	126	374	3,999	3,132
Hongkong	2,364	3,287	43,897	20,468
Australia	25,826	26,352	272,934	251,514
New Zealand	11,680	13,407	88,329	123,139
Canada	24,402	17,951	225,545	158,615
Jamaica	1,201	2,587	15,443	22,979
Trinidad	4,005	4,498	33,072	38,273
British Guiana	309	132	4,486	4,664
Anglo-Egyptian Sudan	1,360	1,928	8,406	16,165
Other Commonwealth	1,726	4,539	19,934	28,942
Irish Republic	3,453	5,971	68,552	52,972
Soviet Union	—	1,004	2,258	2,041
Finland	6,243	2,644	34,143	42,449
Sweden	12,613	8,865	95,804	94,788
Norway	5,986	5,120	51,855	52,151
Iceland	141	230	2,250	2,495
Denmark	6,367	4,121	65,301	62,294
Poland	3	45	862	133
Germany	163	281	1,040	1,372
Netherlands	7,583	8,739	73,108	85,259
Belgium	973	1,124	9,819	7,220
France	296	1,670	4,668	3,685
Switzerland	711	956	9,367	7,755
Portugal	399	612	11,082	7,904
Spain	388	132	3,608	7,002
Italy	1,503	2,139	28,591	10,810
Austria	18	74	385	470
Yugoslavia	183	391	7,340	4,015
Greece	133	370	2,263	2,933
Turkey	631	673	5,121	7,143
Netherlands Antilles	1,288	954	7,822	12,932
Belgian Congo	81	146	1,841	2,434
Angola	50	159	1,749	2,699
Portuguese E. Africa	453	733	3,503	4,098
Canary Islands	36	45	1,541	607
Syria	1,313	110	5,753	1,886
Lebanon	1,707	336	11,591	8,763
Israel	2,261	886	26,404	12,309
Egypt	1,753	3,603	35,203	29,999
Morocco	28	13	1,368	913
Saudi Arabia	404	916	1,327	6,421
Iraq	2,073	4,298	22,182	41,196
Iran	15	763	58,089	8,416
Burma	2,194	984	12,284	10,332
Thailand	633	2,461	13,113	10,073
Indonesia	2,159	2,519	8,483	14,039
China	1	6	4,613	279
Philippine Republic	287	2	2,907	4,044
U.S.A.	4,348	7,199	127,611	43,413
Cuba	569	143	3,480	1,861
Colombia	562	321	7,137	3,524
Venezuela	3,743	6,224	36,565	36,360
Ecuador	1,018	214	2,603	3,520
Peru	1,005	806	10,373	7,065
Chile	617	104	6,891	2,585
Brazil	1,437	302	18,635	19,349
Uruguay	712	428	9,852	3,997
Argentina	3,479	2,941	37,311	30,765
Other foreign	896	1,540	14,944	19,792
TOTAL	210,419	227,103	2,221,798	2,036,788

Total Imports of Iron and Steel and Origin

From	Month ended October 31.		Ten months ended October 31.	
	1951.	1952.	1951.	1952.
India	—	47	12	276
Canada	5,438	17,370	41,646	133,799
Other Commonwealth countries and the Irish Republic	304	1,132	1,575	5,540
Sweden	2,181	2,738	18,048	24,739
Norway	4,027	4,390	42,708	53,973
Germany	13,920	10,952	30,474	96,634
Netherlands	7,906	12,859	64,299	139,932
Belgium	20,117	25,543	148,490	256,969
Luxembourg	7,873	21,461	72,159	154,436
France	23,668	34,959	211,234	268,792
Austria	99	42,444	19,112	187,565
U.S.A.	7,737	45,248	39,237	512,413
Other foreign	2,612	26,527	6,554	209,973
TOTAL	95,882	245,670	695,548	2,045,041
Iron and steel scrap and waste, fit only for the recovery of metal	43,917	66,518	513,016	595,173

Total Exports of Iron and Steel by Group

Product.	Month ended October 31.		Ten months ended October 31.	
	1951.	1952.	1951.	1952.
Pig-iron	591	461	15,282	3,450
Ferro-tungsten	—	10	372	92
Other ferro-alloys	153	213	1,772	2,766
Ingots, blooms, billets, and slabs	12	8	5,172	149
Iron bars and rods	411	311	7,528	2,885
Steel and tinplate bars and wire rods	365	141	11,171	1,048
Bright steel bars	1,752	1,885	26,394	12,325
Alloy steel bars and rods	1,686	1,438	13,699	13,384
Other steel bars and rods	11,461	11,104	147,995	95,014
Angles, shapes, and sections	12,602	9,329	134,577	105,520
Castings and forgings	1,585	744	10,436	9,849
Girders, beams, joists, and pillars (rolled)	1,419	1,892	31,997	27,876
Hoop and strip	7,463	3,589	64,431	39,147
Iron plates and sheets	28	1	1,708	365
Tinplate	16,174	25,854	196,174	241,615
Tinned sheets	148	229	2,054	1,651
Terneplates and decorated tinplates	120	75	1,430	768
Other steel plate (⅛ in. thick and over)	19,319	20,973	221,550	195,243
Galvanized sheets	4,288	6,864	45,913	50,521
Black sheets	13,044	14,344	127,844	112,649
Other coated plates and sheets	441	847	7,156	9,307
Cast-iron pipes up to 6 in. dia.	6,869	6,865	68,140	72,540
Do., over 6 in. dia.	6,101	5,781	58,465	55,694
Wrought-iron tubes	33,140	43,015	329,257	352,002
Railway material	14,696	19,436	182,807	171,749
Wire	4,909	4,433	49,550	42,621
Cable and rope	2,451	2,732	24,412	25,265
Wire nails, etc.	1,809	1,305	22,285	9,826
Other nails, tacks, etc.	386	329	3,462	3,802
Rivets and washers	861	641	6,410	5,474
Wood screws	430	355	3,397	3,190
Bolts, nuts, and metal screws	2,677	1,493	23,762	18,902
Baths	1,511	471	12,229	10,569
Anchors, etc.	604	805	7,680	8,199
Chains, etc.	992	907	9,379	8,685
Springs	717	277	5,418	4,554
Holloware	2,880	3,658	28,943	29,850
Doors and windows	1,964	1,631	17,592	17,577
TOTAL, including other manufactures not listed above	210,419	227,103	2,221,798	2,036,788

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News in Brief

TUDOR ACCUMULATOR COMPANY, LIMITED, has moved its London office to 137, Victoria Street, S.W.1 (telephone: TATe Gallery 0307).

W. G. ALLEN & SONS (TIPTON), LIMITED, light railway and mechanical engineers, have intimated that they will pay the fares of any of their 450 employees who wish to visit London for the Coronation.

ADDRESSING a meeting at Darlington recently, Mr. Hugh Molson, Parliamentary Secretary to the Ministry of Works, said that increased steel production meant an increase of 20 per cent. in factory building during 1953.

THE BOARD OF TRADE is sounding four hundred firms about their interest in a proposed refresher course, particularly on high temperature work, to be held at Sheffield University next Spring for plant and works engineers.

WARWICKSHIRE MEMBERS of the National Farmers' Union have withdrawn their opposition to the scrap metal drive and are now engaged in assembling and depositing it at their nearest railway station at a price of £4 10s. per ton.

NEWTON CHAMBERS & COMPANY, LIMITED, founders and engineers, of Thorncliffe, South Yorkshire, are giving their 4,000 employees a Christmas Eve profit-sharing bonus of £25,000 to celebrate a year of exceptionally good trading.

SHEFFIELD UNIVERSITY is to experiment, in the near future, in training for managers suitable men already in industry who are selected as the right type by their employers. This scheme will be put into operation to satisfy a demand by some large local industries.

THE second reading of the Iron and Steel Bill was approved in the House of Commons late on Thursday of last week. The voting was 305 to 269—a Government majority of 36. The Money Resolution was carried in committee, without debate, by 303 votes to 267.

GOODWIN, BARSBY & COMPANY, LIMITED, of Leicester, makers of heavy machinery for public works contractors, are to build a new works in Bombay. Mr. E. A. Madden is to be the resident manager, and will leave Leicester for Bombay towards the end of January.

PRESENTATIONS on the completion of 50 years' service were made by Mr. H. Riggall, managing director of Ruston Hornsby, Limited, last week. They were to Mr. J. R. Houghton, tool-room foreman; Mr. G. E. Morley, charge-hand core-maker; and Mr. W. Newton, moulder.

MR. A. G. STEWART, chairman of Stewarts and Lloyds, Limited, on December 4, presented 101 employees of Clydesdale Steelworks, Mossend, with gold wrist watches on their completing 30 years' service with the firm. He said the company were presenting 5,000 watches in their works throughout the country.

NUMBER 1 FURNACE at Renishaw Iron Works, Eckington, was blessed by the Rector of Eckington (the Rev. C. W. Silk) on December 5. He was performing the traditional ceremony at the "blowing-in" of the furnace, which had been relined in record time. Mr. J. T. Gilmour, furnace manager, was among those present.

A COVENANT of £500 by the Bradford engineering firm of Crofts (Engineers), Limited, which will be equivalent of £952 in subscriptions, has brought Bradford's total for the King George VI National Memorial Fund to £5,430, according to an announcement by the Lord Mayor's secretary, Mr. Donald R. Teague, on December 6.

MR. ERNEST LEVER, chairman of the Steel Company of Wales, Limited, and Richard Thomas & Baldwin, Limited, said at a recent public dinner that the Iron and Steel Corporation had now advised him that they formally approved the Steel Company of Wales's programme for the further modernization of the tinplate industry.

THE CARGO-LINER Afghanistan berthed at Rothesay Dock, Glasgow, on December 3, with a cargo of over 7,000 tons of scrap steel. The biggest consignment of scrap to arrive in Glasgow since the end of the war, this shipment should ensure full employment for steel workers over the New Year. The Afghanistan loaded her cargo at Basra.

ELEVEN FRENCH GOVERNMENT OFFICIALS, including senior members of Government departments responsible for controlling imports, agricultural development, and national economy, made a tour of the Meltham and Farsley (Leeds) works of David Brown Tractors, Limited, on December 4. This is a goodwill visit, intended to improve our trading relations with France.

AT THE OCTOBER MEETING of the Institute of Australian Foundrymen (Victorian Division), the following films were shown:—(1) "Sand and Steel," a colour film describing all aspects of making stainless-steel castings; (2) a Whiting Corporation film entitled "Mechanization from Yard to Ladle." This film deals with cupola mechanization; (3) "Wheels of Progress," and (4) "Australia and New Guinea," a film describing the reconstruction and development of New Guinea.

RESEARCH DEVELOPMENTS in industry were being jeopardized by the Excess Profits Levy, was a point made by Mr. A. Robert Jenkins, president of the Institute of Welding, in his address to members of the Birmingham branch at their annual dinner in Birmingham on December 4. The levy prevented most firms from making capital expenditure on improvements, he said, and even the wealthiest firms had insufficient left over to do much more than keep their plant in order.

THE UNITED STATES steel industry is showing renewed interest in Brazilian manganese. Shipments of ore, which averaged 22,688 tons monthly during the war, dropped progressively to 9,991 tons in 1951, but rose to 14,839 tons during the first seven months of 1952. The United States took 100 per cent. of the total exports from 1942 to 1947, 77.8 per cent. in 1950, and 88.4 per cent. in 1951. Last August licences were issued to export 24,663 tons, all to the U.S.A. The price averaged $31.54, as compared with $21.65 in 1951 and $17.71 in 1949.

NINETY FOUNDRYMEN representing directors and senior supervisory grades from 13 foundries attended a display of films on productivity and works relationships at the Victory Hotel, Leicester, recently. The show was arranged by the Leicester and District Ironfounding Employers' Association. The films were not solely concerned with ironfounding technicalities, but it was hoped that they would provide ideas which might be of helpful application in the foundry, and simultaneously demonstrate the power of the screen as a method of instruction and education. A commentary on the films was given by Mr. Basil H. Tripp, information and press officer of the Council of Ironfoundry Associations, through which organization the films were obtained.

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Raw Material Markets

Iron and Steel

Neither the expansion in pig-iron production nor the recent substantial increase in prices seems to have exercised any decisive influence in relieving the pressure for prompt supplies. Steelmakers are taking up all the increased output of basic pig-iron and are asking for more. The supply of hematite is barely sufficient for immediate requirements and foundrymen are taking up maximum tonnages of high-phosphorous iron under their fixed allocations. Thus there is no surplus available for the restoration of the export trade. A few export licences for small tonnages have been issued, but with these almost negligible exceptions the shipment of pig-iron oversea is still in a state of suspense.

Impressive tonnages of foreign steel are now arriving at British ports. October imports totalled very nearly a quarter of a million tons and the November arrivals have been on an equally substantial scale. Shipments of American steel are in arrears and the October returns reveal that Austrian supplies were very nearly equal in volume to the arrivals from the U.S.A. Less embarrassed now by a shortage of raw material the mills are achieving better outputs of bars, light sections, etc., and if export orders are scarce owing to keen Continental competition, home demand suffices to provide a satisfactory volume of employment.

There is still an immense unsatisfied demand which extends over the entire range of finished steel products, but most insistent of all is the clamour for steel sheets and strip. Now amply supplied with sheet bars and slabs, the sheet mills are turning out maximum tonnages, but these are quite inadequate to meet home and export requirements, which have been swollen by the rearmament programme. The plate mills are in a very similar position. The boom in tanker tonnage has increased the shipbuilding industry's requirements and these cannot at present be fully satisfied. The recession in the motor industry has eased the pressure in one direction, but there has been no easing off in the requirements of the engineering and wagon building shops.

Non-ferrous Metals

An announcement by the Minister of Supply to the effect that the Government is now able to relax the control imposed some time ago on the use of copper and copper alloys in a number of directions appears to be imminent. This decision will benefit the manufacturers of semis at a time when they can well do with more orders for their products, and will be welcome accordingly. As things are, the consumers of copper are not taking up their monthly allocations in full; in zinc the allocation system was dropped some time ago. As to scrap the change from six months ago is quite remarkable, and it must be expected that the Ministry of Supply will soon, and at long length, make up its mind to rescind the Order imposing maximum prices for non-ferrous scrap and secondary brass and copper. The present Order has been a dead letter for long enough, for the ceiling quotations these listed bear no relation to reality. Business in brass and copper semis has certainly declined to a marked extent, as a result of which nickel is now the only metal which may be deemed to be in any way difficult on the supply side.

Talk of a reopening of the copper market next year persists and there are some who feel that this may take place on July 1 next. Time will show how correct this forecast is.

There was a further rally in lead last week. Strange though it may seem in view of the rather poor demand from the trade, there appears to be something of a squeeze for early dates. In the United States the price has remained at 14 cents., but the futures market was decidedly firm following the upward movement in London. The cash position in tin was marked down to the extent of nearly £5, but the forward quotation improved to the extent of 25s. and, in consequence, the backwardation narrowed from about £15 to £8. An increase in Metal Exchange stocks is the explanation of this improved state of affairs, and everyone concerned with the tin market will hope that the tendency will continue. Demand for tin in the U.K. is well maintained.

Official tin prices on the London Metal Exchange were as follow:—

Cash—Thursday, £954 to £954 10s.; Friday, £952 to £952 10s.; Monday, £949 10s. to £950; Tuesday, £949 to £951; Wednesday, £949 10s. to £950.

Three Months—Thursday, £945 10s. to £945 15s.; Friday, £944 10s. to £944 15s.; Monday, £944 10s. to £945; Tuesday, £944 to £945; Wednesday, £944 10s. to £945 10s.

Refined lead official prices, December and March:—Thursday, £94 15s. to £95; Friday, £97 to £97 10s.; Monday, £96 5s. to £96 10s.; Tuesday, £94 10s. to £94 15s.; Wednesday, £94 15s. to £95.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

To the Editor of the FOUNDRY TRADE JOURNAL.

IRON & STEEL BILL

SIR,—Mr. James Bell's letter in your JOURNAL of December 4 calls for the shortest of replies. He has gone to a lot of trouble to compile a detailed justification for the various proposed additional controls which both Mr. Lee and he in their letters of November 6 declared were no more than already existed. It was the accuracy of this statement which I challenged, and apparently rightly so.

Regarding the levy clause, surely Mr. Bell does not mean to imply that because we shall now pay the expenses of a Board, the services of any present Ministry officials can be dispensed with—and does he mean that these same Ministry officials have no experience of the industry after the years of helpful co-operation we have had from them ?

Regarding " powers of search," Mr. Bell's argument is not logical. He advocates the permanent employment of a doctor (in the form of a Board representative) to look after a self-inflicted disease (in the form of controls), which could be instantaneously cured by a simple surgical cut (in the form of deletion of Clause 4 in the third schedule of the Bill).

Finally, I have not forgotten this Bill has been brought forward by a Conservative Government and also (which Mr. Bell neglects to say) by our own foundry associations. I wish I could.

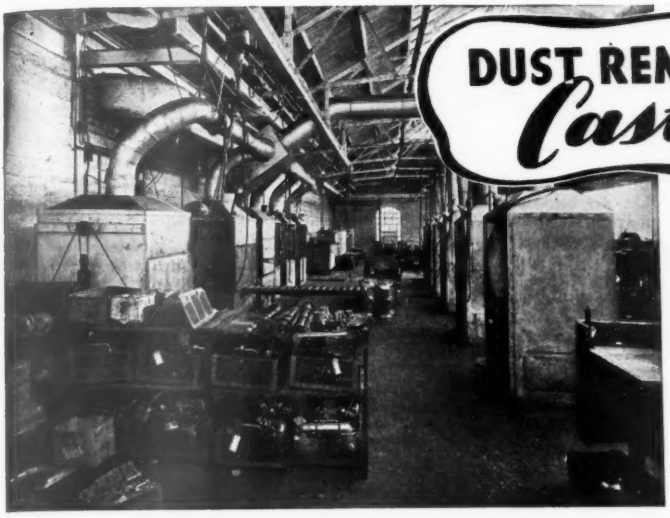
Yours, etc.,

R. C. SHEPHERD.

Ruston & Hornsby, Limited, Lincoln.

December 10, 1952.

Mansfield Standard Sand Company, Limited, announce that they have been granted permission by the Minister to reserve deposits of sand which the local authorities wished to exploit for building purposes.



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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered, unless otherwise stated)

December 10, 1952

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £13 1s. 6d.; Birmingham, £12 15s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £16 8s., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £15 5s. 9d.

Scotch Iron.—No. 3 foundry, £15 19s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £17 14s. 6d. South Zone, £17 17s.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £18 14s. 6d.; South Zone, £18 17s.

Cold Blast.—South Staffs, £18 2s.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £16 2s.; Scotland (Scotch iron), £16 8s. 6d.; Sheffield, £17 3s.; Birmingham, £17 9s. 6d.; Wales (Welsh iron), £16 8s. 6d.

Basic Pig-iron.—£13 19s. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered.)

Ferro-silicon (6-ton lots).—40/55 per cent., £57 10s., basis 45% Si, scale 21s. 6d. per unit; 70/84 per cent., £86, basis 75% Si, scale 23s. per unit.

Ferro-vanadium.—50/60 per cent., 22s. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 10s. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £204; ditto, copper-free, £212.

Ferro-tungsten.—80/85 per cent., 27s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 30s. 8d. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £85 4s., basis 60% Cr, scale 28s. 3d. per unit; 6/8 per cent. C, £80 17s., basis 60% Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. per lb. Cr; max. 1 per cent. C, 2s. 2½d. per lb. Cr; max. 0.15 per cent. C, 2s. 3½d. per lb. Cr; max. 0.10 per cent. C, 2s. 3¾d. per lb. Cr; max. 0.06 per cent. C, 2s. 4d. per lb. Cr.

Cobalt.—98/99 per cent., 20s. per lb.

Metallic Chromium.—98/99 per cent., 6s. 5d. to 6s. 9d. per lb.

Ferro-manganese (blast-furnace). — 78 per cent., £49 0s. 8d.

Metallic Manganese.—93/95 per cent., carbon-free, £262 per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 40s. to 60s. per lb., Nb + Ta.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 4s. 6d.; tested, 0.08 to 0.25 per cent. C (100-ton lots), £25 14s. 6d.; hard (0.42 to 0.60 per cent. C), £27 12s.; silico-manganese, £33 8s.; free-cutting, £28 8s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £31 9s.; case-hardening, £31 17s.; silico-manganese, £34 9s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 8s.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 8s.; acid, up to 0.25 per cent. C, £31 17s.

Sheet and Tinplate Bars.—£25 3s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £29 14s.; boiler plates (N.-E. Coast), £31 1s. 6d.; chequer plates (N.-E. Coast), £31 3s.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £27 17s.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £31 15s. 6d.; flats, 5 in. wide and under, £31 15s. 6d.; hoop and strip, £32 10s. 6d.; black sheets, 17/20 g., £41 12s. 6d.; galvanized corrugated sheets, 24 g., £52 9s.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £50 18s. 3d.; nickel-chrome, £71 7s. 9d.; nickel-chrome-molybdenum, £79 2s. 6d.

Tinplates.—57s. 1½d. per basis box.

NON-FERROUS METALS

Copper.—Electrolytic, £285; high-grade fire-refined, £284 10s.; fire-refined of not less than 99.7 per cent., £284; ditto, 99.2 per cent., £283 10s.; black hot-rolled wire rods, £294 12s. 6d.

Tin.—Cash, £949 10s. to £950; three months, £944 10s. to £945 10s.; settlement, £950.

Zinc.—G.O.B. (foreign) (duty paid), £110; ditto (domestic), £110; "Prime Western," £110; electrolytic, £114; not less than 99.99 per cent., £116.

Lead.—Refined pig-lead: December, £94 15s. to £95; March, £94 15s. to £95.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £130 15s.; rolled zinc (boiler plates), all English destinations, £128 15s.; zinc oxide (Red Seal), d/d buyers' premises, £136.

Other Metals.—Aluminium, ingots, £166; magnesium, ingots, 2s. 10½d. per lb.; antimony, English, 99 per cent., £225; quicksilver, ex warehouse, £70 10s. to £71 (nom); nickel, £454.

Brass.—Solid-drawn tubes, 26¾d. per lb.; rods, drawn, 37d.; sheets to 10 w.g., 291s. per cwt.; wire, 32¾d.; rolled metal, 277s. 9d. per cwt.

Copper Tubes, etc.—Solid-drawn tubes, 32¾d. per lb.; wire, 317s. 9d. per cwt. basis; 20 s.w.g., 346s. 3d. per cwt.

Gunmetal.—Ingots to BS. 1400—LG2—1 (85/5/5/5), £195 to £218; BS. 1400—LG3—1 (86/7/5/2), £207 to £238; BS. 1400—G1—1 (88/10/2), £320 to £375; Admiralty GM (88/10/2), virgin quality, £335 to £380 per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £350 to £385; L.P.Bl, £250 to £275 per ton.

Phosphor Bronze.—Strip, 413s. 3d. per cwt.; sheets to 10 w.g., 435s. per cwt.; wire, 49¾d. per lb.; rods, 44¼d.; tubes, 42¾d.; chill cast bars: solids 4s. 2d., cored 4s. 3d. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Ingots for raising, 2s. 9½d. per lb. (7%) to 3s. 10½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 3s. 3¾d. (7%) to 4s. 4½d. (30%); to 12 in. wide × .056, 3s. 3¾d. to 4s. 4½d.; to 25 in. wide × .056, 3s. 5¼d. to 4s. 6¼d. Spoon and fork metal, unsheared, 3s. 0¼d. to 4s. 1¼d. Wire, 10g., in coils, 3s. 9¾d. (10%) to 4s. 10¼d. (30%). Special quality turning rod, 10%, 3s. 8¾d.; 15%, 4s. 2d.; 18%, 4s. 6¼d. All prices are net.